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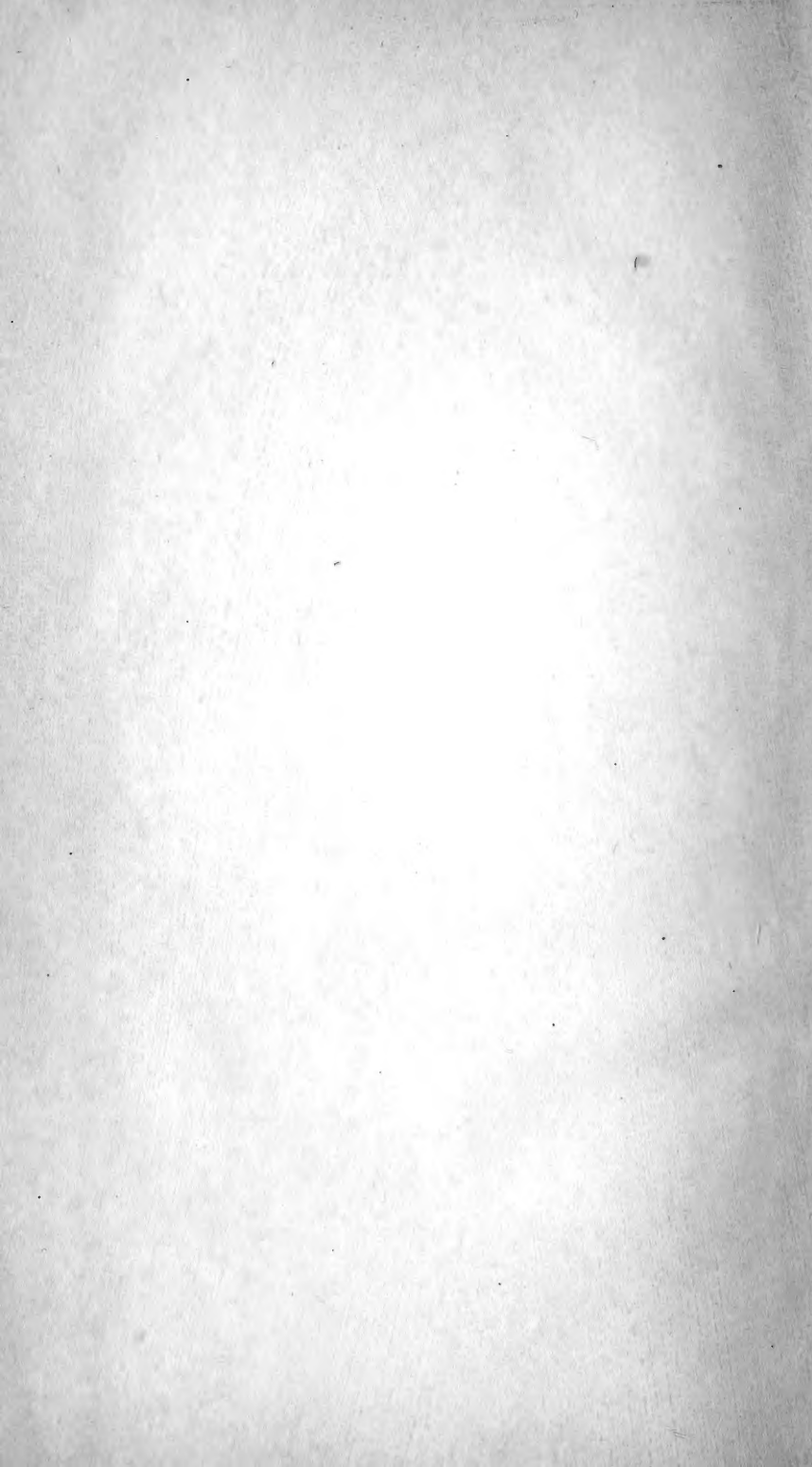
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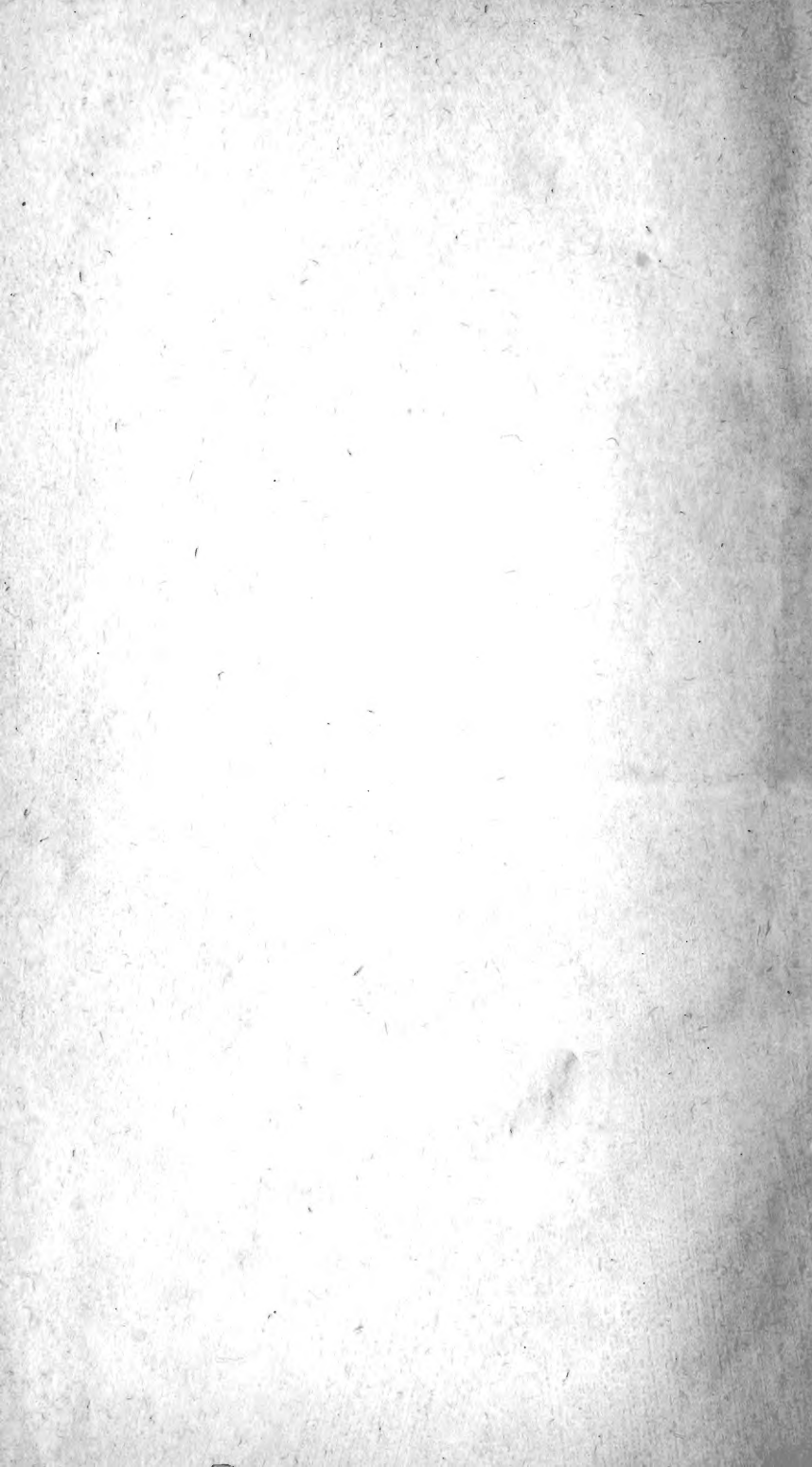
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VOL. V.

From 1832---1834.

EDITED BY

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1835.

is not wonderful that fables should be arisen concerning the nightingale, for there are still mysteries connected with his appearance and departure which the most searching investigations of modern science have not yet explained. He comes among us very suddenly about the 14th or 15th of April—punctual, almost to the day; his plumage, so fresh, so unruffled, in every way perfect, that a long flight over hundreds of leagues of land and sea appears highly improbable. It has been noticed, too, that when captured immediately after his first appearance, he has a slight pleasant odor of earth, freshly turned, or after a Summer shower. One might once imagine that, like some of our most beautiful moths, he has just emerged from a deeply-ripened chrysalis; added to which, his extraordinary fearlessness of man for the first few days of his advent, which renders his capture so easy, might lead the fanciful to picture him to himself as a newly-formed creature, as yet unaware that man was a natural enemy.

So bold is he on his first arrival that, if a portion of the earth be freshly raked over, or turned up with a spade by one of those birdcatchers, who in the season make a trade of capturing nightingales, these birds will immediately approach the spot to seek for insects, ere the hunter is scarcely out of sight; and if, close to the newly-turned earth, a "clasp net" have been baited with the irresistible attraction of a meal-worm, the capture of the unsuspecting victim is certain. Last season I was much annoyed by seeing one of these bird-catchers leaving the woods and Pinners with seventy male nightingales so captured, just at the time that every copse in the neighborhood was beginning to resound with their enchanting music.

In order to account for the smell of fresh earth about the plumage, and the perfectly unruffled texture of the flight feathers, it has been conjectured that this interesting bird hibernates by lying itself in the ground, but there are many unanswerable arguments against this theory. For instance, it is known that in the southeastern islands of the Mediterranean Sea, in Asia Minor, and the north of Africa, the nightingale is found throughout the winter, so that he does not hibernate at all, in the generally accepted meaning of that term.

Another nightingale mystery is the capricious character of his distribution during his summer appearance in northern and western Europe. It might be imagined that coming from warmer climates, he would seek the mild-portion of our island, and that Devonshire or Cornwall would be his most favorite localities. But such is not the case. In the eastern portion of England he locates himself as far north as Durham; while in many of the midland counties his presence is unknown. To account for this seeming discrepancy it has been conjectured that, coming over from the continent by the narrowest part of the Channel, he directs his course according to the situation of districts landing in wood and water, where alone the natural food he requires is to be found in sufficient quantity; so that a bare range of down-like hills, a country in which small water-courses are few, may at once stop his progress in such a direction. That he travels to us from southeast is more probable conjecture, as in the south of France he appears ten days earlier than with us, and in southern Italy even in the middle of March. This seems to prove that the tide of migration follows the first expansion of the young leaves, and the simultaneous appearance of many kinds of insects which forms his food.

Both Aristotle and Pliny both notice that his first note is heard at the moment that the first

is true only to a certain extent, for he continues in song during the whole of May and the greater part of June; but it is only at first that we hear the proud and passionate burst of the love-song, that has inspired the poets. It is in the days preceding the pairing time, and those of the season of "courtship," that he puts forth his greatest brilliancy and his loudest vocal powers—the melodies of his "married life" being of a calmer character, though still far above any other music of the woods.

On their first arrival, contests take place for favorite localities, and the strongest and most courageous prevail. As the same individual birds and their offspring return to the same places each successive season, these combats often take place between the male parent and the strongest young male bird of the first brood—in fact, shocking as it may seem, between father and son, and the young prodigal often succeeds in beating off his parent, who has to put up with the second-best position, though perhaps still triumphing in song over his stalwart son, from his new dominion, some thirty or forty yards from the old one.

The plumage of both sexes is very similar, a rich ferrugineous light-brown on the back, getting rather brighter at the tail, while the general tone of the under parts is a light silvery gray. The nest is a slight but very picturesque structure composed of small twigs in the outer part, and with substances of a somewhat softer texture in the interior, such as dry bents of grass, stray horse hairs, or other suitable materials. The eggs are about the size of those of the hedge-sparrow, but rather longer, being more oval in form. Their color is a rich greenish olive, rather darker and greener in tone than ordinary brown paper, and they have no spots or markings of any kind. The plumage of the young bird is brown, mottled all over with lightish ochreous spots, more or less regularly distributed. In general appearance young nightingales so closely resemble young robins, while still in their nest feathers, that they are often mistaken for each other.

To conclude with a bathos, we are told by the Italian naturalist (quoting Petrarch) that a certain landowner in the north of Italy got up night after night, in the nightingale season, for the express purpose of destroying the nocturnal annoyances which disturbed his rest; and that not succeeding in extirpating the enemies of sleep in this manner, he proceeded to the extreme measure of cutting down the woods to a considerable distance round his house, which proved a more effectual defence against the intolerable nuisance. Still worse than this is the following: The nightingale after the close of the breeding season, having been well supplied with an abundance of insect food during the Summer, is in very fine condition during the month of September—in fact, very plump and fat; and his flesh having been tasted by connoisseurs at that season, and pronounced fully equal to that of the brated ortolan, thousands are captured in the south of France (the country of the troubadours) as table delicacies. As, however, many of the troubadours themselves, especially the one whose adventures have been set to music by Signor VERDI, did not meet with much better treatment, we need not be surprised at the fate of a plump and delicious nightingale.—*Once a Week.*



great surgeon, JOHN HUNTER, who left nothing uninvestigated within the widest range then known to his professional pursuits, accounted for the extraordinary power of the nightingale's song by the size and strength of the muscles of the throat, which he found to be much more extensively developed than in any other singing bird; and this unusual development of the organs of the throat may account for the tradi-

tions of talking nightingales. PLINY asserts, for instance, that DRUCUS and BRITANNIUS, the sons of CLAUDIUS, had nightingales that could speak both Greek and Latin; and that these birds might have been taught by ingenious Greek trainers to utter a few phrases with tolerable distinctness is exceedingly probable, as such traditions have always some foundation; but when the enthusiastic old naturalist of the Trajanean era goes on to tell us that the birds in question carried on debates "in right good rhetorical form," we are compelled to doubt the assertions of our venerable authority, whose superstitions on this subject one is nevertheless inclined to treat with the greatest leniency, partly on account of his evident enthusiasm and entire belief in what he states, but more especially on account of his delightful and accurate description of the nightingale's song, as he, no doubt, had often heard it himself in the woods about his beautiful villa at Como—the Como which, then as now, was esteemed one of the fairest spots of northern Italy. Among other fabulous anecdotes related by the good old Roman naturalist is that concerning the great singer, STESICHORUS, who was said to be indebted for the highest beauties of his art to the fact that a nightingale had perched upon his lips when a child as he slept, and that he had unconsciously drunk in the melodious strains then poured forth, by the recollection of which he afterward became famous. As regards talking nightingales, PLINY's assertion is not unsupported; for we find GESSNER, the modern Theocritus, the modern master of Idyllic poetry, and at the same time an experienced naturalist, describing two caged nightingales belonging to an inkeeper at Ratisbon, who, in the silence of the night, talked with each other, repeating phrases which they had heard during the day. Even BUFFON, while ridiculing the credulity of PLINY, and mistrusting to some extent the statement of GESSNER, says that when reared from the nest they may be taught to talk. The prices paid in Rome for caged nightingales appears to have been really fabulous—AGRIPPINA, the wife of the Emperor CLAUDIUS, having paid, as PLINY tells us, an enormous sum for a white nightingale, while an ordinary bird of extremely perfect song would sell for as much as a robust and well-trained slave.—*Once a Week*.

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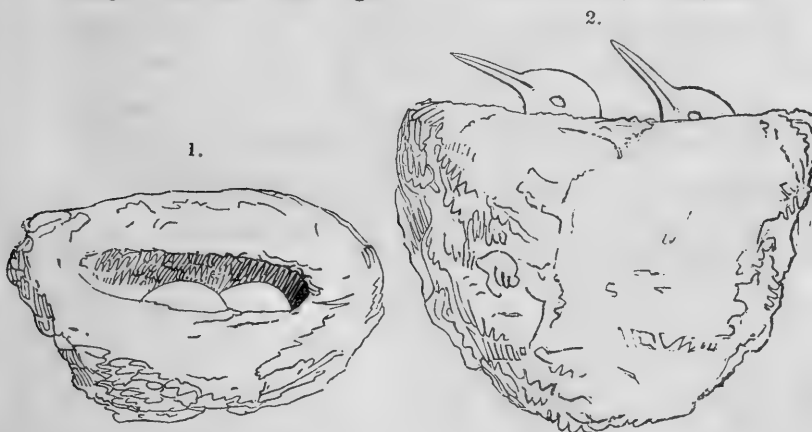
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THE ZOOLOGICAL JOURNAL.

January—May, 1829.

ART. I. *Extract of a Letter from Capt. Lyon, R.N.,
Corr. Member Z.S., &c., to a Friend in England, dated
Gongo Soco, Brazil, 17th March, 1829.*

I AM too closely confined here, and too constantly occupied to attend much to Natural History, or any thing except the mines; but it may interest you to have an account of some young Humming Birds whose hatching and education I studiously attended, as the nest was made in a little orange bush by the side of a frequented walk in my garden. It was composed of the silky down of a plant, and covered with small flat pieces of yellow lichen. The first egg was laid January 26th, the second on the 28th, and two little creatures like bees made their appearance on the morning of February 14th. As the young encreased in size, the mother built her nest higher and higher, so that from having at first the form of figure 1, it became ultimately like figure 2



The old bird sat very close during a continuance of the heavy rain for several days and nights. The young remained blind until February 28th,

and flew on the morning of March 7th without previous practice, as strong and swiftly as the mother, taking their first dart from the nest to a tree about 20 yards distant.

ART. II. *On a new Species of Antelope.* By HENRY WOODS, Esq., A.L.S., F.Z.S., &c.

Antelope personata. Ant. cornibus acutis, sublunatis : corpore fusco variato ; natibus disco albo ; facie fasciâ canâ.

BOMPTÉ-BOK, Cape Colonists.

[TAB. I.]

THE Antelope, of which a more detailed description was promised in the last number of the Journal, unfortunately died a few days after the accompanying figure was taken, which was within a week of its possession by Mr. Cross, so that no opportunity has occurred either of studying its habits, or of correcting the drawing. Since its death it has, by the liberality of John Morgan, Esq., passed into the Museum of the Zoological Society; but for the reasons hereafter mentioned, little additional accuracy could be derived from the stuffed skin.

This animal, which I have ventured to name *Antelope personata*, from the unusual marking of the face, is in appearance intermediate between the Genera *Antelope* and *Capra*, and might therefore appropriately be associated with the Chamois. It possesses the thick short body, and large head of the Goat, with all the influential characters of the true Antelope : the individual under consideration, however, it must be borne in mind, was very young, and how far its form, and even its colours and markings might alter when arrived at its full stature, which was reported by the person who brought it to this country to be little inferior to that of a Red Deer, we have yet to learn, as the species does not appear, as far as I have been able to discover, to be known to Zoologists. Having placed my drawing in the hands of Mr. Gray, I am happy to say that I have had my opinion of its novelty confirmed by Major H. Smith, to whose inspection that gentleman submitted it.

The native country of this Antelope is the vicinity of the Cape of Good Hope, where we may conclude that it is exceedingly rare, from its having escaped the notice of Barrow, Lichtenstein, Burchell, and other South African travellers: hence I have been able to gather no information respecting its mode of life; but it has evidently been seen sufficiently often to be recognized by the Dutch colonists, as they have given it an appellation. The following description is a precise transcript of notes taken during two visits to the animal whilst alive.

Its size was that of a Goat, the body being about 2 feet and a half in length; the head large; the neck (for an Antelope) short; the body thick-set, being very deep at the shoulders, between which was situated a small but well-defined hump, from which, no doubt, its vernacular name has been derived; the legs long, slender, graceful, and deer-like.

The head was much elongated from the horns to the muzzle; very wide from the frontal bone to the angle of the jaw, and suddenly tapering from the latter to the face, which becomes, in profile, narrow to the muzzle; the frontal bone projected considerably; the upper part of the nasal bones was concave; they were then convex to their termination. The top and sides of the head, forehead, and round the eyes, were of a fulvous brown, a white crescent-formed streak extending from under each eye to the ear.

The horns were short, not exceeding 6 inches in length, round, black, smooth, excepting one annulus at the base, diverging laterally, and again converging slightly at their tips; in a profile view they were nearly straight, slanting backwards, their points being again slightly inclined forwards.

The ears were very large, six inches and a half long, and proportionably broad; on the outside they were of a dark dun or mouse-colour, with the margins white, and the extreme tips black; in the inside grey, crossed by two broad black bands.

The eyes were large, and of a chesnut-brown, their expression soft and 'gazelle-like:' the suborbital sinuses were very small, but distinct.

The singular marking of the face suggested the specific title, which I have imposed upon the animal. From between the horns arose a dark grey stripe, which was continued to the muzzle, its grey colour being produced by a mottling of short black and white hair; at first it was nar-

row; then expanded in a trifling degree; again contracted, and, when level with the eyes, widened suddenly and proceeded, as a broad mask, to the nose, extending to the cheeks considerably, and on each side of the centre of the face: throughout its whole extent it was margined with deep brown; a brown shade also mingled with the grey across the middle of the mask.

The nose was broad and dark grey, nearly black; the muzzle hairy; the lips brown, furnished with a few grey hairs.

The neck and back were dull dark fawn-colour, a little freckled with yellowish brown; the throat, chest, and abdomen, and the insides of the arms and thighs, of a very light Isabella, as were also the knees and elbows. An indistinct grey stripe, caused by the presence of a few white hairs thinly scattered amongst the fawn-coloured fur, occupied the situation of a dorsal line, on the lumbar regions.

The sides were of a deep rich and glossy brown, which commenced at the breast, and passed, in an oblique line at its upper boundary, to the crupper, where it almost deepened to black: its lower margin extended half way down the upper arms, along the side of the belly, and down the outside of the thighs, nearly to the hocks.

On the buttocks was situated a white oval disk, (similar to that of many of the American Deer,) which included the upper part of the tail: below the disk the tail terminated in long, coarse, scanty, black hairs, being altogether about 8 inches in length.

The legs were of a beautiful pale reddish fawn-colour. The fur on the neck and shoulders was rough and long, but smooth and close on all other parts.

The nearest similitude to the figure and general appearance of this species is possessed by the Vacte Steenbok, *Ant. rufescens*, Burchell, also a very rare animal having the same habitat, of which a specimen was presented to the British Museum, and figured and described in Griffith's Translation of the Règne Animal;* but the two Antelopes differ in the following particulars. Although the direction of the horns, in profile, is similar in both, those of the *Ant. rufescens* are parallel, and without the annulus; the mask on the face, and the hump on the shoulders, are

* Griffith, Vol. IV, p. 249, and Synopsis, Sp. 839.

wanting in that species ; the disk on the buttocks is not so circumscribed or so well defined as in *Ant. personata* ; the tail is a mere rudiment ; and the general colour of the superior parts is bright fulvous red, with a cast of crimson.

Upon seeing the preserved skin of the Bompté-bok, I was much struck with the alteration which had taken place in its appearance since its death, which brought forcibly to my mind Mr. Waterton's humorous illustration of the effect which stuffing usually has upon the skins of quadrupeds. I do not mention this circumstance as calling in question the ability of the operator at the Museum of the Zoological Society, whose reputation is well deserved, but with the hope of usefully supplying a hint to those who might be inclined to derive from such specimens generic or specific characters. In all cases some considerable distortions by partial shrinking and expansion will inevitably take place, and, unless a living specimen of the same species exist as a model, it is utterly impossible to preserve the true figure of an animal : for how can a correct form be assumed, the type of which is totally unknown ? This observation will be well borne out by the subjoined enumeration of the principal points of difference between the preserved skin and the living animal.

The head in the former is much shortened ; the ears shrivelled to two-thirds of their original size, the internal black bars having lost the greater part of their colour ; the mask has likewise shrunk and become so pale as scarcely to present a prominent character. From the adolescence of the specimen, and the consequent great vascularity of the nuclei of the horns, their direction has so far changed, during the process of drying, that their tips do not at all incline forwards, and the horns themselves, being very thin at their bases, have in shrinking nearly lost the annulus ; the neck is too long ; the humeral hump has entirely disappeared ; and the body is very much too thin, the skin either having shrunk, or been stuffed to the model of some other Antelope ; finally, the whole of the colours are infinitely lighter and more obscure, having totally lost their richness and the evanescent purple hue, which so often and so beautifully appears on the fur of Ruminant animals, when seen in the vivid freshness of animation.

ART. III. *The Characters of Clinidium, a new genus of Insects in the Order Coleoptera, with a Description of Clinidium Guildingii. By the Rev. WILLIAM KIRBY, M.A., F.R., L., and Z.S., &c.*

THE remarkable insect, of which I now offer a description to the Editors of the Zoological Journal, inhabits St. Vincent's, and was taken in a rotten tree, in the woods of Mount St. Andrew's in that island, by the Rev. Lansdown Guilding, and sent me with a valuable collection of insects, by that indefatigable collector, accurate painter, and learned describer of the zoological treasures of the Caribbean Islands and Ocean.

This insect, like the *Pseudomorpha excrucians*,* presents characters of several different and distant tribes, so that after a very close inspection, and diligent comparative investigation of its characters, I feel uncertain to what modern group, larger or smaller, to refer it. As the specimen received from Mr. Guilding was somewhat mutilated, and gummed down upon a piece of card so that I could not examine the under side of it, I drew up as accurate a description of it as I could, and sent it to that gentleman under the name here given, requesting him to make a figure of it from his own specimens, and to furnish such further characters as they might supply him with. His observations, which I have now received, though they throw some further light upon the subject, do not yet enable me to decide upon the exact station of the insect. I shall begin by laying down the characters of the genus as far as I am, at present, enabled to ascertain them.

Genus. CLINIDIUM.†

Labrum punctiforme, minutum.

Mandibulæ subforcipatæ.

Maxillæ nondum investigatæ.

* Kirby in *Linn. Trans.* xiv. 98.—t. iii. f. 3.

† From κλινιδιον, a couch, from its form.

Palpi articulo extimo elongato, acuto.

—— *maxillares* } nondum investigati.
—— *labiales* }

Labium nondum investigatum.

Mentum latum, utrinque tumidum.

Antennæ moniliformes, undecim articulatae : articulo primo basi subatenuato, apice sequentibus crassiori, reliquis subglobosis, extimo subacuminato.

CORPUS apterum. *Caput* pedunculatum, ex oblongo-subquadratum. *Oculi* reticulati nulli. Spatium laterale, lævigatum, nitidum, subquadratum pone antennis oculos repræsentare videtur.* *Prothorax* ex oblongo subquadratus, marginatus, lateribus rotundatis, angulis obtusiusculis ; suprà medio longitudinaliter profundè et latè canaliculatus, basi utrinquè longitudinaliter foveatus, ut in *Harpalidis* plurimis. *Coleoptra* oblonga. *Pedes* breves, longitudine fere æquales : *cubitis* apice intus subemarginatis ; sinu pectinato, utrinque calcarato †‡ tibiis apice calcari triplici ;‡ tarsis brevibus, pentameris, unguiculatis : unguiculis brevissimis simplicibus. *Sterna* complanata : prosterno anticè constricto posticè emarginato-bifido ; mesosterno posticè bilobo, lobis divaricatis ; metasterno quinquelatero, angulo umbilicum mesostethii spectante.

From its pentamerous tarsi, the sculpture of its prothorax, its neck, and the tendency to a notch at the inner side of the extremity of the cubitus, one is led to suspect some approximation in the insect before us to some of the *Harpalidæ*, or some other group of Linné's genus *Carabus*, but as Mr. Guilding has not yet been able to investigate the maxillæ

* Mr. Guilding used a powerful Dollond's achromatic microscope in the examination of this insect, but even with this aid he could discover no lenses or reticulations in the space here supposed to represent the eyes.

† From Mr. Guilding's figure, it seems as if the lower part of the pectinated notch terminated in a spur, as in the *Harpalidæ*, &c. I cannot discover the pecten in my specimen, but there is something like the spur ; being gummed down, however, I cannot speak with confidence.

‡ I can see nothing of a triple spur in my specimen, but the gum may have obliterated it. Mr. Guilding thinks that the pecten and the spurs are used by the animal to make its way out of the tree it passed its first states in.

and ascertain whether the lower lobe is unguiform, and the upper palpi-form, which would decide the question, and as the other characters lead to other groups, it would be rash to affirm that it belongs to any of these tribes. Indeed its short, rather thick, legs, and its short tarsi are quite unlike these limbs in the predaceous Beetles, and shew that it is not swift of foot; if it has any eyes, likewise, which seems very doubtful, they are not prominent, as in the *Eutrechina*, and the antennæ are quite dissimilar.

Its aspect is that of a heteromerous beetle, belonging either to Latreille's *Melasoma*, or his *Taxicornes*, but we soon discover a neck which would lead us to the *Trachelides*, of which, however, it exhibits no other character; and indeed when we examine the structure of its antennæ, the terminal joint of its palpi, and its prothorax, we see clearly that it can belong to no tribe of that, as it now stands, artificial section.

It exhibits also some general resemblance to the Rhynchophorous genus *Brentus*, which, I believe, is also a timber devourer, but it seems to me still nearer to *Cucujus*, Fab., as, for instance, *Cuc. rufus*, which has a pedunculated head, and another North American species, which, like *Clinidium*, is pentamerous. It has not, however, the depressed body of *Cucujus*; its head, prothorax, and antennæ, differ, and no other coleopterous insect yet known, agrees with it in the absence of reticulated eyes: so that it is the only known individual that strictly verifies the old proverb, "As blind as a beetle."

Till we know how it is circumstanced with respect to its maxillæ and palpi we cannot decide with confidence upon its natural station.

CLINIDIUM GUILDINGII.

Long. Corp. Lin. 3.

Hab. in Insulâ Caribbeâ St. Vincent, in arbore putrescenti.

DESC. Corpus lineare, suprâ partibus elevatis glaberrimis nitidissimis, aterrimis; depressis vero plerumque subtomentosis, opacis, subcinereis. *Caput* facie plagis elevatis septem; intermediâ rhomboideâ, vel ex rhomboideo lanceolatâ, cum aliis duâbus parvis triangularibus anterieus ordinatâ; lateralibus internis quadrato-oblongis, externis oculos simulan-

tibus ?* trapezatis. *Mentum* latum, utrinquè tumidum. *Gula* tumida. *Collum* capite dimidio angustius.† *Antennæ* robustæ capite longiores : articulis transverso-subglobosis, coronulâ setularum cinctis. *Prothorax* ovalis, quasi pulvinatus. *Elytra* profundè sulcata, vel porcata : porcis sex elevatis ; intermediis abbreviatis, duabus longioribus apice connatis. Apex ipse et basis coleoptrorum apud suturam in foveam magnam et profundam excavati. *Tarsi* reliquo corpore minus nigri, subsetacei, subtùs haud pulvillati, hirsutuli. *Abdomen* ventre medio longitudinaliter prominulo : segmento ultimo tuberculo nitido armato.

Var. β . Atro-castaneum, calcaribus minoribus. An idem nuper declaratum ?

Explanation of the Plate. [TAB. II.]

Fig. 1. *Clinidium Guildingii* very highly magnified.

- a. The space supposed to represent the eye.
- b. The pecten of the Cubitus.
- c. One of the triple spurs that arm the tibiæ.

Fig. 2. The under side of ditto.

- a. The prosternum.
- b. The mesosternum.
- c. The metasternum.
- d. The umbilicus.
- e. The eye-space.

Fig. 3. The space supposed to represent the eye, very highly magnified.

Fig. 4. The neck and part of the head as exhibited by the specimen sent to Barham.

- a. Part of the head.
- b. The neck.

* It seems to me very doubtful whether this space, which occupies the sides of the head, both above and below, does really represent the eyes, its quadrangular shape and levigated surface do not favour that idea, and it is too near the occiput. See Plate II, Fig. 2. e. and 3.

† Mr. Guilding, in the particulars he has added to my original description, and of which I have, in most cases, availed myself, describes the neck by the term *latum*, and his figure so represents it ; but in my specimen it is not so wide, and rather longer in proportion, (Fig. 4.) so that it must either be a distinct species, or perhaps the other sex.

10 Mr. Blackwall's *Extracts from his Zoological Journal*.

ART. IV. *Extracts from a Zoological Journal, kept at Crumpsall Hall, near Manchester.* By JOHN BLACKWALL, Esq., F.L.S., &c.

Crumpsall Hall, July 1st, 1829.

SIR,

NOT having any thing of greater interest to communicate at present, I transmit to you a few extracts from my journal ; requesting, that if they should be considered too trifling or unconnected to appear in your valuable publication, you will, without hesitation, commit them to the flames.

I am, Sir, with much respect,

Your obedient Servant,

JOHN BLACKWALL.

To N. A. Vigors, Esq., &c. &c.

NIDIFICATION OF BIRDS.

BIRDS sometimes construct their nests in unusual situations, and occasionally modify their structure in order to adapt them to peculiar circumstances. The following examples exhibit instances of departure from the ordinary rule, in these particulars.

In the month of April, 1821, three pairs of Rooks built in some low Black Italian Poplars, growing in the back-yard attached to the residence of the late Miss Hall, situated in King-street, in a central part of the town of Manchester. Considering that they had to collect all their materials in the country, the rapidity with which these birds proceeded in their undertaking was truly surprising : their nests were speedily completed ; they deposited their eggs in them ; and, though they were frequently much disturbed by the eager curiosity of idle people who crowded about the premises, desirous to witness so extraordinary a sight, they ultimately succeeded in rearing their young, and conveying them to a place of greater security. In the ensuing spring, the Rooks again visited their nest-trees, and began to repair their former habitations with great dili-

gence ; but the Jackdaws, which had commenced building in the steeples of St. Ann's and St. Mary's, two churches in the vicinity, pilfered the sticks they brought as fast as they were supplied, till, at last, the Rooks, wearied with fruitless exertions, deserted the spot, and sought a locality better adapted to their purposes.

In the summer of 1823, a pair of Spotted Flycatchers built a nest in a bird-cage, which had been left, with the door open, suspended from the branch of an apple-tree, in the garden belonging to E. Turner, Esq., situated in the township of Crumpsall. In this nest the female laid three eggs, but forsook them in consequence of the repeated alarms she experienced from the frequent visits of the younger branches of Mr. Turner's family, who were attracted to the spot by the novelty and singularity of the occurrence.

A pair of Chimney Swallows, in the summer of 1824, built a nest in a hole, from which a brick had fallen, under the eaves of a house at Crab-lane, in the chapelry of Blakeley. It consisted of a breastwork of mud, erected about two inches within the aperture, leaving a space for entrance, and the interior was lined with hay and feathers. The female deposited and incubated her eggs in this nest, and the nestlings, when about half grown, by their pressure against the breastwork of mud, broke it down entirely. The parent birds, without attempting to re-build the breastwork thus injured, immediately began to construct another, rather lower than the former one, quite at the entrance of the hole ; affording their young, by this sagacious proceeding, a more ample space than they enjoyed before, combined with a much greater degree of security.

The familiarity of the Redbreast is a matter of almost daily observation to those who are engaged in rural pursuits. In the month of June, 1825, a pair of these birds built a nest in a small saw-pit, situated in Crumpsall. Soon after the female had begun to sit, the sawing of timber was commenced at this pit, and, though the persons employed continued their noisy occupation close to the nest every day during the hatching of the eggs and the rearing of the young, yet the old birds performed their several parental offices to their progeny without interruption, and apparently without alarm.

Ornithologists are aware that House Sparrows frequently deprive the House Martins of their nests, and, fitting up the interior after their own

12 Mr. Blackwall's *Extracts from his Zoological Journal.*

manner, retain possession of them ; but perhaps it is not so generally known, that they sometimes expel the Sand Martins from their subterraneous retreats, at the farther extremities of which they construct nests, meagre in dimensions, and scanty in materials, when compared with the bulky fabrics which they build in trees, and under the eaves of houses, where they are less restricted in room.

House Martins, before they retire in autumn, are sometimes observed to repair their nests ; and I have ascertained, by marking birds of this species, that they regularly return to their accustomed breeding haunts. It may be remarked also, that they occasionally assist each other in constructing their nests, as I have had several opportunities of witnessing. The intelligence manifested by this species will amply repay the observer for the attention he may bestow upon its manners and economy.

It is well known that the Yellow Bunting generally makes a very substantial nest, yet, from some internal defect, (for there did not appear to be any in its external configuration,) a female of this species, in June last, deposited its eggs on the bare ground ; in which situation it sat upon them till they were hatched. It is evident that birds of the same species possess the constructive powers in very different degrees of perfection ; for, though the same style of architecture is usually adhered to, the nests of some individuals are finished in a manner greatly superior to those of others. In the instance before us, the requisite instinctive capacity appears to have been wanting altogether, as it is known to be in the Goat-sucker, Cuckoo, Cow-pen bird, and some species of water-fowl.

THE ROOSTING OF FIELDFARES.

In the spring of the year 1812, which was cold and wet, being on a visit at a friend's house, near Tamworth, in Staffordshire, I remarked that great numbers of Fieldfares prolonged their stay in that part of the country till the second week in May, which is considerably beyond their usual time of departure. At the close of day, they regularly assembled in an extensive wood in the neighbourhood, and roosted on the ground, among the withered grass and fern, under the trees and bushes. This fact tends to confirm the observation made by Mr. White, (Nat. Hist. of Selborne, Letter XXVII, addressed to T. Pennant, Esq.,) that Fieldfares, though they frequently perch during the day, always appear to roost on

the ground : but a near relation of mine, to whom this species is familiarly known, assures me, that on moon-light nights, he has shot individuals with his air-gun, as they sat at roost on the naked branches of lofty trees. The practice of roosting on the ground, therefore, is not so invariable as Mr. White supposed it to be.

FALCON AND PIGEON.

Some of the larger species of Falcon may occasionally be seen flying over Manchester in pursuit of the Pigeons which are kept in that town. Several years since, I saw a fine Peregrine Falcon, so occupied, stoop at a Pigeon, which adroitly avoided the deadly blow by a dexterous turn; in a second attempt, however, the Falcon proved more fortunate, as it succeeded in carrying off its prey. Perceiving that it bore away its booty in the direction which I was pursuing, I kept a sharp look-out for it, and, at the distance of about a mile from the town, I observed it amusing itself with the quarry, by repeatedly rising with it to a great height in the air, letting it drop from this lofty elevation, and descending after it with astonishing velocity. Approaching as cautiously as I could, and seizing a favourable opportunity, I succeeded in frightening away the Falcon and securing the Pigeon, which was much mutilated; the head being separated from the body, which had been deeply pierced, in many places, by the sharp talons of the Falcon. Now, as the manner in which birds of the Falcon tribe take their prey on the wing, has long been a subject of controversy among naturalists and sportsmen, who have variously conjectured that they inflict the fatal stroke with the beak, the breast, the wings, and the talons, my principal object in introducing the above anecdote is the explanation of this difficulty. In the present instance, it is evident, from the peculiarity of the situation, that the Falcon could not descend with its victim to the ground, as is usually the case, and this circumstance enabled me to ascertain with precision, the manner in which it effected its purpose. Stooping impetuously, it struck the Pigeon with great violence on the neck with its beak, and keeping its hold, it raised its feet, and so transferred the prize to its talons, in order that it might impede its flight as little as possible, and, consequently, be more readily conveyed to a distance. Should it be objected, that the circumstances under which this Falcon seized its prey, might induce it to change its usual mode of

attack ; I would reply, that it performed the feat with wonderful promptness and dexterity, not at all in a manner to be expected from a novice. In short, there can scarcely be a doubt that the means employed were those to which it was impelled by its natural instinct.

ART. V. *Notes on the internal appearance of several Animals examined after Death, in the Collection of the Zoological Society. By T. H. HOLBERTON, Esq., M.R.C.S., &c., and WILLIAM YARRELL, Esq., F.L.S., F.Z.S., &c.*

[Continued from Vol. IV, page 322.]

ACTIVE GIBBON. *Hylobates agilis*, F. Cuv.

THE *skeleton* presented seven true, and six false ribs on each side, the last three floating. The upper and lower extremities incapable of the same degree of extension as in man, either at the elbows or knees, owing to strong fascial expansions of the flexor tendons passing in front of the elbow, and behind the knee joints, to be attached to the upper halves of the respective bones below these parts.

The *stomach* was placed more longitudinally than in the human subject, particularly from the cardiac orifice, the first two-thirds passing straight down the left side; the other third portion crossed directly over to the right, terminating in the *duodenum*, which soon passed again towards the spine, (not being placed so far to the right as in the human subject,) and enclosed the head of the *pancreas*. The coats of the stomach were remarkably and uniformly thick; the great *omentum* quite devoid of fat; no *valvulæ conniventes*, nor *appendices epiploicæ*. The large *intestines* were thrown into folds by three longitudinal bands, as in the human subject. A long glandular body of 2 inches and $\frac{5}{8}$ in length and nearly $\frac{1}{4}$ of an inch wide, placed in the folds of the mesentery, appeared to perform the office of the mesenteric glands. The attachments

of the mesentery were much higher up than in the human subject. The *kidnies* in situation, and the ureters in their passage, resembled the human, the latter terminating in the upper part of each side of the bladder. The *spleen* was situated like that of the human subject, and very similar in appearance. The vessels in Glisson's capsule laid also similarly to those of the human subject. The *Pancreas* and *Liver* presented nothing remarkable, the small lobes of the latter were not quite so well defined as in man. *Small intestines* 5 feet 6 inches in length; *appendix cæci vermiformis* 2 inches; *large intestines* 18 inches. The *rectum* dilated in the pelvis forming a pouch. Two bodies having the appearance of *vesiculæ seminales*, but very minute, the animal being young, occupied the usual situation, as did also the *vasa deferentia*.

DIANA MONKEY. *Simia Diana*, Linn.

Cercopithecus Diana, Geoff.

Length from the mouth to the root of the tail 17 inches; of the tail itself 24 inches. *Stomach* a single cavity, *small intestines* 4 feet; no *cæcum*; *large intestines* 2 feet in length. This Monkey had appeared unusually dull and drowsy some days before death; the intestines were generally of large volume, the *colon* and *rectum* distended with the remains of food. A considerable quantity of water pervaded the cellular tissue of the lower extremities.

WEEPER MONKEY. *Cebus Apella*, Desm.

Length from the nose to the root of the tail 10 inches, tail 11 inches; length of the whole intestinal canal 6 feet 10 inches. Kidnies inflamed, particularly that on the left side; lungs, liver, and intestines generally healthy. Bones of the extremities irregular in form, quite cartilaginous, and devoid of earthy deposition; those of the head perfectly soft and flexible, inferior maxillary bone the same. The cerebral and spinal nerves, when in a relaxed state, exhibited a spiral filament passing along their substance, which disappeared on tension. P. P. Mollinelli, who described this appearance, in 1775, seems to be the first anatomist who mentions this arrangement of the nervous filaments of the human subject within their covering of the *pia mater*: they form small transverse,

folds more or less obliquely angular, and were not inaptly compared, originally, to the rugæ of earth-worms, or the rings of the *aspera arteria*. See Elliotson's Translation of Blumenbach's Physiology, Section 212.

MEXICAN DOG, young. *Canis familiaris*, var. *Mexicanus*.

Length from mouth to anus 13 inches; whole length of intestines 5 feet 4 inches; cæcum 2 inches, of the ordinary form. Dentition irregular and imperfect; no apparent cause of death.

JERBOA. *Dipus Sagitta*, Gmel.

When divested of its skin, the form of the head in this animal is peculiar. The upper surface of the *cranium* is nearly square; the mastoid processes are unusually large, excavated, and their *parietes* diaphanous. They occupy the whole space behind the zygomatic arch on either side, and extend beyond the occipital bones backwards, and even with the surface of each parietal bone upwards. From the anterior portion of the nasal bones to the occipital ridge was 1 inch $\frac{9}{16}$; from the anterior surface of the malar bone to the back of the mastoid process of the same side $1\frac{4}{16}$; the width of the head between the edges of each *zygoma* $1\frac{3}{16}$; behind the zygomatic arches $\frac{7}{8}$ of an inch; across the mastoid processes 1 inch; mastoid cells projecting backwards beyond the occipital surface $\frac{1}{8}$ of an inch.

The *meatus auditorius* directed backwards; the malar bones so deep in front that vision is confined to the lateral and backward directions. The *masseter* muscle, large, arising from the under edge of the *zygoma* and orbit, passes downwards and backwards to be inserted into the base, angle, and ascending plate of the inferior *maxilla*; raising, bringing forwards, and also giving a limited degree of lateral motion to the lower jaw. The muscle analogous to the temporal arising from the *fossa* in front of the orbit, passing under the *zygoma*, is inserted on the fore part and side of the lower jaw. The *portio dura* passed outside the muscle elevating the jaw, under the edge of the *zygoma* to the angle of the mouth to be distributed over both lips. The branches of the infra-orbital nerve were distributed in the usual manner. The reason for noticing these nerves was on account of their unusually large size.

The *flexors* of the legs were not inserted by single tendons, but ended in a broad thin tendinous expansion which enveloped on either side the head of the *gastrocnemius* and all the *flexors* of the foot and toes, to be afterwards inserted into the whole length of the *tibia*, giving additional power to its own muscles as also to those covered by this *fascia* in its course. The capsules of the joints admitted great extension. Descriptions of two species of this genus having been given by Pallas in his “*Novæ species quadrupedum e glirium ordine*” with representations of a skeleton, stomach and *cæcum*, it may be only necessary to add, that, the *lungs* appeared of a more dense structure than usual; the *stomach* simple; *liver* of large size; *small intestines* 26 inches long; *cæcum* 6 inches, curved spirally; *large intestines* 18 inches: the animal measured from mouth to anus 6 inches. It was a female with very long uterine *cornua*. The ensiform cartilage terminated in a broad flattened extremity similar in shape to the same part in the Bobac, which comes next under consideration.

BOBAC. *Arctomys Bobac*, Gmel.

Died from the effect of a very large abscess which formed between the skin and pectoral muscles, confined principally to the right side. The ensiform cartilage, united to the *sternum* by a narrow neck, had a thin expanded heart-shaped termination, to both lateral edges of which muscular fibres were attached.

The *heart* had a glandular substance lying upon its sternal surface, which surrounded its base and the primitive vessels. Two portions then passed backwards in the *thorax* attached to each side of the dorsal vertebræ. There was an ossification of the thoracic *aorta* to the extent of an inch and a half. Length of the animal from the mouth to the root of the tail 15 inches. *Stomach* a single cavity; *liver* formed of two principal lobes, that on the right side subdivided into three minor ones; the form of the *gall-bladder* nearly circular; *small intestines* 5 feet 6 inches in length; *cæcum* large, filled with fæcal matter; *large intestines* 2 feet 10 inches. The fibres of the pubic surface of the bladder had a longitudinal and somewhat curved direction; upon the sacral surface the fibres of the upper half were transverse, on the inferior half they were curved similarly to those of the opposite side.

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MALABAR SQUIRREL. *Sciurus maximus*, Gmel.

Length from mouth to anus 14 inches ; intestinal canal 13 feet. *Stomach* large in proportion to the size of the animal, triangular in shape, somewhat contracted at the cardiac extremity with a broad surface opposed to the right side ; the *spleen* very small, of the size of a goose-quill, and only 1 inch and a half long.

CRESTED PORCUPINE. *Hystrix cristata*, Linn.

Extreme length from nose to anus 2 feet 4 inches. *Small intestines*, 17 feet ; *cæcum*, 18 inches ; *large intestines*, 4 feet. This animal was very fat. The cause of death was not ascertained.

ALPINE HARE. *Lepus variabilis*, Pall.

Length from mouth to anus 17 inches ; the *stomach* showed an apparent division externally ; internally the two different lining surfaces described by Sir E. Home were distinctly observable, that of the cardiac portion being the most vascular. *Small intestines* 7 feet in length ; *cæcum* 16 inches ; *large intestines* 3 feet 8 inches. General form and duplicatures of the different viscera very similar to those of our common Hare, *Lep. timidus*. The animal appeared to have died from the effects of hydatids, which in considerable numbers pervaded the whole abdominal cavity.

ART. VI. On the *Œstrus* of Mr. Bracy Clark. By W. S. MACLEAY, Esq., A.M., F.L.S., &c. In a Letter to the Editor.

My dear Vigors,

Two reasons have hitherto prevented me from taking notice of Mr. B. Clark's singular paper on *Œstrus*, independently of the consideration that for my part I confess I have little more to say on the subject. The first of these reasons is, that, from the difficulty of knowing the particular conclusion at which he wishes to arrive, the paper in itself unanswerable. The second is, that Mr. Clark has most sapiently laid down the following law in the Linnean Transactions, viz. "that identifying the descriptions of the ancients with the modern species of "natural history, should be avoided in the volumes of the Society."

Mr. W. S. MacLeay on the *Æstrus* of Mr. B. Clark. 19

My crime in attempting to make out the ancient *Æstrus* is no doubt according to this rule very great; but I trust that I shall meet with some little mercy, as Mr. Clark himself led the way, by attempting in his first paper to identify the modern *Æstrus* with that of the ancients, and as I have only followed, at a humble distance, the footsteps of this lawgiver.

The argument indeed by which Mr. Clark quenches for ever any attempt to identify the animals described by the ancients, namely, that it leads to much unsatisfactory discussion, is most conclusive; and I really think, that as the identification of the species of modern authors likewise leads very often to unsatisfactory discussion, the council of the Linnean Society ought to extend the bright idea which they have adopted,* and to prohibit the identification of all species whatsoever. The argument holds equally good in both cases.

In order to do full justice to what Mr. Clark calls his Reply, it may perhaps be necessary to repeat the statement to which he replies. Now the object of my unfortunate paper was to shew, first, that the *Æstrus* of the ancients, as described by them, was not a modern *Æstrus*; and secondly, that “it is not indeed unlikely that some of the ancients should “have seen the perfect insects of the modern *Æstrus* flying about cattle, “and that they should have witnessed the extraordinary effects which “they produce, but, however this may be, they certainly appear to “have confounded such insects with the more common *Tabani*, for it is “the modern *Tabanus*, or some genus extremely near to it, that they “have always described as the *Æstrus*.” Such are my words. Now let us see how they are replied to.

When I heard that Mr. Clark had read a paper to prove me in the wrong, I rather foolishly imagined, that, as the question under discussion was the *Æstrus* of the ancient Greeks, I should be overwhelmed with a host of new passages from ancient authors. But Mr. Clark holds such weapons in sovereign contempt, and annihilates my paper with only three

* We must here observe, that we do not acquiesce in the conclusion apparently drawn above, that the editors of a paper “adopt the ideas” of the authour. For our own parts, we consider the authour alone responsible for the opinions or expressions contained in the papers which we publish. *Ed.*

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passages, and those all from modern writers,* viz. one from Shakspeare, who therein says, that the brize annoys the herd more than the tiger; one from Thomson, who says that when thus annoyed, they scour the plain and cut various other unseemly capers; and lastly one from an old play, the author of which proposes to plant a brize, by way of spur, into some nameless part of some inactive and nameless gentleman. These three English passages form a main body of evidence, that, according to Mr. Clark, most decidedly prove the *Œstrus* of Aristotle to be that of Linnæus. I may, therefore, take less notice of the light skirmishers which appear on the field to support the same cause, in the shape of passages from the *Lachesis Lapponica* of Linnæus, one of which says, that in Lapland the *Œstrus* of the Reindeer has an egg like a white mustard seed, and another that the Reindeer stop short and remain motionless on the sight of their peculiar tormentor. The appositeness of these quotations to the subject in question is not very manifest, but I suppose the mode of reasoning from them is as follows: if the egg of the Lapland *Œstrus* be like a white mustard seed, and if the Reindeer in Lapland stop short, *ergo* the *Œstrus* of Aristotle must be that of Bracy Clark, and the Oxen in Greece on being tormented by their *Œstrus* do not stop short.

Mr. Clark says that Linnæus, Vallisneri, Reaumur, and, though last, not least, Bracy Clark, hold the opinion that the *Œstrus* of the ancients is the *Œstrus bovis* of Linnæus; and he therefore pronounces Ray, Olivier, Latreille, and Kirby to be heretics, nay, even Aristotle, Ælian, and Pliny themselves to know nothing about the matter, if they have dared to write otherwise than as he would have them. It is right, however, for Mr. Clark's glory, to assign him the full force of this *argumentum ad verecundiam*, for Linnæus having changed his opinion once with respect to the ancient *Œstrus*, might, if he had lived, have changed it again.

* It is true Mr. Clark repeats the hackneyed passage from Virgil, but it is for the sole purpose of unfolding from it the following "curious discovery," which is thus solemnly imparted to the Public, through the medium of the *Linnean Transactions*. Alluding to the words "*Cui nomen Asilo Romanum est, Œstron Graii vertere vocantes;*" Mr. Clark says, "From this admirable description, it is clearly manifest that *Asilus* was the Roman name for the fly which agitates the cattle; and it is equally clear, that *Œstrus* was the Greek name for it."

As for Vallisneri, he knew about as much of entomology as he did of steam-boats; and Reaumur* expresses himself in doubt as to the Greek *Æstrus*. Consequently, the only opinion that remains at once valuable and decisive on the subject is that of Mr. Clark. It is, in short, Bracy Clark solus, *versus* Ray, Olivier, Latreille, and Kirby; nay, even *versus* the ancients themselves, if they have the impudence to contradict him. The question indeed is concerning the *Ὀϊστρος* of the ancients; but this is of the very slightest consequence, for says this diffident logician, “if Aristotle, Ælian or Pliny described the insect which they called *Æstrus* with spotted wings, or with a trunk or proboscis, they knew nothing at all about the true *Æstrus bovis*.” I beg leave to inform Mr. Clark that he has most thoroughly convicted these ancients of ignorance, for although they have not audaciously proceeded so far in their guilt as to verify quite his worst suspicions, and to describe their *Æstrus* as having spotted wings, these ignorant philosophers, to their shame be it said, nay, even Æschylus himself, although he is one of those poets whom Mr. Clark considers as better authority on a scientific question than any philosopher, have all, as I have shewn, described their *Æstrus* as having a *proboscis*. What follows then? Why, that although we wish to ascertain what Aristotle, Ælian, Pliny, and Æschylus, considered an *Æstrus*, those ignorant philosophers, and that still more inexcusable poet, knew nothing at all about their own insect, the accurate knowledge of which is the snug and sole property of Mr. Bracy Clark. His “practical pursuits” and his “curious discoveries,” entitle him, and him alone, to decide the question as to the true *Æstrus* of the ancients.

Indeed, upon Mr. Clark’s profession depends a great deal of the argument; for if, says he, “MacLeay or Latreille had been as much among cattle on the heaths, as my pursuits have led me, they would have long since obtained a practical acquaintance with the effects produced by these insects, and would not have been led to suppose that the

* Reaumur mentions the subject as a doubtful one, Vol. IV, p. 540. He seems to make a distinction between the *Æstrus* and *Asilus* of the ancients, and merely appropriates the latter name to the *Æstrus bovis*, because Vallisneri had done it before him. “M. Vallisneri veut que ce nom soit donné à notre mouche. Aussi l’appellerai-je volontiers en François.” Such are his words.

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“*Tabani*, *Conopses*,* or *Culices*, were the object of poetic description.” M. Latreille, I dare say, has witnessed these practical effects, that is, a Cow dancing a hornpipe with a Gadfly, and I am sure, so have I; but no matter, I shall only hint, that as the “practical pursuits” of Aristotle and other ancients did not much lead them among cattle on the heaths, this may have probably been also the cause of their being so shamefully ignorant of their own meaning.

Mr. Clark talks of his “curious discoveries” on this singular tribe of insects. Now, the reason why I committed the heinous fault of overlooking this gentleman in my paper, was, that I conceived these “discoveries,” when correct, to have been already discovered by others, and found these “discoveries,” when his own, to be almost always in direct opposition to the fact. In the paper before us, there are, however, some truly curious and original discoveries, and I shall state them at length, in order that Mr. Clark may no longer complain of my overlooking him.†

First Discovery.—Mr. Clark finds that there is a scoundrelly set of

* As to “*Conopses*,” I never heard of their existence before, and certainly never mentioned the names in my paper either of these new animals, or of *Culices*, as being the *Æstri* of the ancients. I ought to plead guilty, however, to the accusation that I have been led to suppose that a *Culex* has been the object of poetic description. If Mr. Clark be not too old to go to school, he will find so too.

† By far the most accurate and laborious work that has yet appeared on the genus *Æstrus*, is that of Johannes Leonardus Fischer, published at Leipsic, in 1787. This gentleman gives a *Synopsis Specierum*, and a correct and detailed account of the natural history and anatomy of *Æstr. ovis*, *Æstr. bovis*, and their respective larvæ. And yet this Mr. Bracy Clark, who talks of his curious discoveries, published many years afterwards a work on *Æstrus*, wherein he describes two or three new species with such abominable names as *veterinus* and *salutiferus*; pirates from Mouffet and Reaumur, the history of *Æstrus equi*; describes the pupa of *Æstrus* for its larva, which it appears that he does not even yet know; gives an anatomy of both pupa and perfect insect that would equally answer for that of a Whale; and finally makes a new genus, of which to this day he does not know the true character, and names it in direct defiance of every Linnean rule. Such is Mr. Clark’s paper on the Bots of Horses, and yet it is indisputably the best paper that the old Linnean School ever published on Zoology in England. I allude not of course to Mr. Kirby’s papers, because he belongs to an infinitely superior class of Naturalists.

flies composed of *Tabani*, "*Conopses*," *Asili*, and *Culices*, which have all spotted wings, and of which the three first have lately taken to the filthy habit of "sweat sucking." Our worthy "Naturalist," however, is still in doubt whether *Culices* suck.*

Second Discovery.—A new tribe of animals called "*Conopses*," which, having so classical a name, were no doubt also known to the ancients, and I hope when Mr. Clark describes them in the next volume of the Linnean Transactions, he will also identify them. So far as I am concerned, I assure him there will be no disagreeable discussion on the subject, although some ignorant innovators are very likely to change the name as being too near to *κωλυπες*.

Third Discovery.—"*Æstri* are like ichneumon flies, which deposit "their eggs on the sides of caterpillars of *Lepidoptera*, and then hatching, perforate their skins and live on the parenchyma." Now, I do say, that of all this gentleman's "curious discoveries," this is the most curious, that ichneumon flies, in order to perforate caterpillars, walk out of the eggs which they themselves have laid.

Fourth Discovery.—The testimonies of the ancients with respect to *Æstrus* militate against each other, according to Mr. Clark. I only trust that, when the members of that Linnean Council which so acutely distinguished the merits of Mr. Clark's paper, are re-elected, they will allow him to shew how.

Fifth Discovery.—The greater part of Mr. Clark's paper is taken up with shewing that the presence of an *Æstrus bovis* has a greater influence on an Ox than that of a *Tabanus*.† I am not aware of any

* What in the name of heaven has put "*Conopses*," *Asili*, and *Culices*, into this learned Theban's head? The ancients knew but too well the *Culices* to take them for *Æstri*. The *Asili* are insectivorous insects, and the *Conopes*, which I suppose he means, are, in their larva state, parasitical upon Humble Bees, and, in their perfect state, perfectly harmless. The *Conops calcitrans* of Linnæus, is, indeed, an insect that sucks blood, (not sweat, as I know by sad experience both here and in Europe,) but this species was some fifty years ago separated from the genus by Geoffroy and Degeer under the name of *Stomoxys*.

† I have already said that the ancients as well as the moderns, such for instance as the author quoted by Archdeacon Nares, may all have confounded the Brize with the *Æstrus* when flying. The fact is, we inherit this confusion

person having ever disputed this; but the contrary assertion is here to my mind most valiantly combated, upon the principle, I suppose, that the truth cannot be too often told.

Sixth Discovery.—Mr. Clark had in his first paper stated that the *Æstr. bovis*, according to his own experience, makes no noise; but notwithstanding one might have thought that his “practical pursuits on heaths” entitled him to decide this weighty matter, it appears that a farm-yard friend of his has still more “practical pursuits,” for he by standing among dung *once* heard some noise, and Mr. Clark accordingly discovers the truth and abandons his own experience. Hence we learn, on Mr. Clark’s own authority, that his friend in the farm-yard is still a better judge of poetic description than himself. Virgil’s words “asper, acerba sonans” are certainly rather difficult to surmount if the insect be a silent one.

Seventh Discovery.—Mr. Clark has just discovered that “*Æstrus bovis* has no aculeus or weapon of infliction in the abdomen.” Very new and ingenious indeed! He appears to have formerly thought it hymenopterous. But as of all *Diptera* it is the least provided with a sting in the mouth, some people will perhaps fancy that Mr. Clark is here arguing against himself, since if he be right, and the *Æstrus* have no sting; and if the *Æstrus* of the ancients be described by the poets as *οξύσομος* and be said by the philosophers *ἔχειν κέντρον ἰσχυρὸν ἡρτημένον τοῦ στόματος*, why then the innocent *Æstrus* of Mr. Clark cannot be their insect.

However, the cream of consistency is to come. In p. 404, Mr. Clark comes to the conclusion that the fly of Aristotle, Ælian, and Pliny, “may have been a *Tabanus* or an *Asilus*, a *Conops*, or a *Culex*, or any other with spotted wings;”* and in p. 409 he arrives without any new argument, but with equal confidence, at the diametrically opposite conclusion, “that the *Æstrus* of the ancients could have been no *Tabanus*.”

as to the name from the Saxons; the Germans still confounding the Bremse and the Breme. But in the time of Mouffet the Brize was the *Hæmatopota pluvialis*, and the Burrell-fly or Whame was the *Æstrus equi*.

* How precise and scientific! particularly when not one of the ancients makes mention of spotted wings.

Ohe! jam satis! His arguments and his mode of using them are, I will admit, of such an extraordinary nature, as fully to entitle him to come not only to the two extreme conclusions, but also to five hundred intermediate ones. Still, as it is rather puzzling to guess Mr. Clark's real decision, I trust the Council of the Linnean Society will either allow him to append a supplement, stating which of the two opposite conclusions is his final opinion, or that they will have the condescension to state, for the good of the Society at large, what they conceived to be his real sentiments when they ordered the paper to be printed. I repeat that the paper is so truly original in natural history, classical lore, style, and orthography, that I find it impossible to answer it. I may humbly venture to deny, however, the accuracy of Mr. Clark's assertion, that I ever expressed or even entertained a wish to change the name of the genus *Æstrus*.

I would here ask a question, most important to the future interests of the Linnean Society. Is it not advisable for the Council to alter their present plan, and to insist upon the person to whom a paper is referred, making a written report upon the manner in which any opinion is supported? Similar reports are made on all papers given in to the French Institute. The critic's personal reputation being then at stake, the Council at large might be sure that no paper would be unjustly condemned or stupidly lauded.

Ever, my dear Vigers,

most truly your's

W. S. MacLeay.

ART. VII. *Observations on the Chitonidæ*. By the Rev.
LANSDOWN GUILDING, B.A., F.L.S., M.G. & W.S., &c.

Tribus. POLYPLAKIPHORA, Blainv.*

Fam. *Chitonidæ*, Gray, Guilding.

Animalia cæca, hermaphrodita? plantivora?

Corpus ovato-elongatum; apicibus æqualibus, rotundatis: disci vertice nunc longitudinaliter subcarinato, nunc rotundato-subdepresso.

* Locum melius demonstravit Cuvierius.

Lorica dorsalis, calcareo-testacea, in globum convolvenda (animali avulso) : cujus

Scuta (vel *tegulae*) octo, sæpius denudata, raro minutissima, nonnunquam oblecta, (in monstrosis 6 vel 7 ? ?) : sæpius transversa, marginibus omnibus vel plerisque deorsum imbricatis, lateribus declivatis. *Scutum primum* sæpius semicirculare, margine antico symmetricè crenato, postico simplici : *scuta* intermedia contracta, plerumque transversa, margine antico immerso, lobato-alato, alis sæpe medio fissis ; margine postico subtus subcostato, lateribus alarumque sinu sæpe fissurato-denticulatis : *scutum extremum* posticè crenatum, alæque integræ : scuta omnia infrà lævia, lineis puncturarum notata propter insertionem musculorum innumrabiliū. Areola dorsalis angulato-transversa, nunc distincta nunc obsoleta : peripheriæ stria impressa testæ incrementum nonnunquam demonstrat.

Zona (vel *cingulum*) continua, carnosa, sæpius crassa, cartilagineo-muscularis, corpus totum obtegens, latitudine et vesturâ multum varians, margine ipso ciliato, subtus planato, ossiculis creberrimis scabriuscula ad arciores adhæSIONEM. Sæpe in canales zona contrahitur ad aquæ receptionem, et stercoris ejectionem.

Pallium (verum) indistinctum, continuum, tenue, agglutinatum, contractum, vix ac ne vix quidem margine liberum, branchia pedem et caput omnino circumdans.

Pes maximus carnosus, fere longitudine corporis. Solea complanata adhæsiva.

Caput sessile magnum, cæcum, *pileo* latissimo obvelatum, margine tenui libero, et posticè in angulos extenso loco tentaculorum. *Tentacula* nulla.

Os infrà, extensile, *labris* plicatilibus crassis, carnosis.

Lingua brevissima, apice lobata.

Velum tenue, extensile, loco mandibulæ superioris.

*Trachyderma** (organum edendi et manducandi) tracheæforme, denticulatum, membranaceum, fere longitudine abdominis, posticè in *oesophagum* tubo-canaliformem semiclausum productum, anticè in alas duas extensum, quæ apices *Siagoniorum*† vesiciformium arcè tegunt. Mem-

* Α τραχὺς asper, et δέρμα cutis.

† Siagonia, a σιαγόνην pars maxillæ.

brana tota internè serie duplici dentium molarium minutorum, innum-rabilium, transversorum, oppositorum, munita: seriebus ad *palatum* denticulatum recedentibus, postice gradatim mollibus: dentibus omnibus tendinibus obliquis parallelis impulsis. *Abdominis viscera* profundè immersa, loricâque defensa.

Intestinum gracile, corpore multoties longius, mirè convolutum. *Ovarium* maximum, dorsale.

Ventriculus magnus.

Anus posticus, supra pedis extremitatem, sæpe tubiformis.

Branchiæ nudæ, lineares, elongatæ, utrinque in medio fossulæ pro-fundæ lateris sitæ: sæpius longitudine pedis, nonnunquam abbreviatæ. Lobi acuminato-digitiformes, lineâ mediâ lineolisque transversis crebris signatæ, apice sæpe decumbentes.

Structuram Poli et Cuvierius (nomina veneranda) bene demonstra-verunt. Vide Cuv. Mem., &c., sur les Mollusques.

SYNOPSIS GENERUM.

1. *Chiton*, Linn. (a græca voce *χιτών* tunica). Lorica scutis maxi-mis imbricatis transversis nudis. Zona (vel ligamentum continuum peri-pheriæ) tenuior, coriacea, lata, squamulosa, vel squamis conformibus subovatis distinctis alternatim (ut in piscibus) dimidiato-imbricatis vestita.

* Zonâ distinctè squamosâ.

† Disco subcarinato: areolâ transverso-marginali distinctâ. Exemp.

Chiton squamosus, Sowerb., Gen. f. 2. *Ch. Capensis*, Gray, &c.

†† Disco subrotundato, lævi: areolâ angulatâ obsoletâ. Ex. *Chiton marmoratus*, Blainv.

** Zonâ exillimè reticulatâ. *Ch. lævis*, Lowe, Zool. Journ.

*** Zonâ lævigatâ. *Ch. marginatus*, Linn. Trans. VIII, p. 21, t. 1, f. 2. *Ch. latus*, Lowe.

2. *Acanthopleura*, Guild. (Etym. ἄκανθα spina, et πλεϋρόν latus.) Lorica præcedentis. Zona crassa, carnosa, spinosa, spinulosa, crinita,

vel scabra : spinis laxè insertis ; nunc variæ longitudinis raris, nunc confertis. Pagina inferior ossiculis distinctè scabra. Peripheria ciliata.

- * Zonâ spinosâ. *Chiton spinosus*, Sow., Gen. f. 1.
 - ** Zonâ spinulosâ. *Ch. Carmichaelis*, Gray, Spicil.
 - *** Zonâ granulosâ. *Ch. asellus*, Lowe, Zool. Jour.
 - **** Zonâ rugoso-granulosâ. *Ch. aselloides*, Lowe.
 - ***** Zonâ crinitâ. *Ch. crinitus*, Wood, Ind.
 - ***** Zonâ villosâ. *Ch. Peruvianus*, Frembly.
 - ***** Zonâ farinosâ. *Ch. cinereus*, Lowe.
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3. *Phakellopleura*, Guild. (α φάκελλος fasciculus, et πλεϋρόν latus.) Loricæ scuta minora. Zona crassa, carnosa, lata, serie unicâ fasciculorum elongatorum spiculorum ornata : spicula sericeo-vitrea, acufornia, nunc conferta, mox expanso-radiantia, urentia. Peripheria distinctè ciliata. Pes latus. Ex. *Ch. fascicularis*, Sow., gen. f. 3.

4. *Chitonellus*, Lam. (Chitonis diminutivum.) Loricæ scuta minima, contracta, ferè abscondita : alæ magnæ nonnunquam sagittatæ. Zona valdè crassa, carnosa, fere denudata, vel scabriuscula, peripheriâ ciliatâ. Pleura punctis spiraculiformibus perforata.

* Animal larviforme. Scuta sæpius disjuncta, branchiæ abbreviatæ, pes contracta ? *Ch. lævis*, Blainv. *Ch. larviformis*, Burrow. *Ch. striatus*, Sow.

** Animal brevius, subovatum. Scuta approximata, pes latus. Pori zonæ valdè distincti spinulis cincti.

Chitonellus latus, Guilding.

Ch. scutis cretaceis, disco lateribusque fusco fasciatis : lateribus granulato-scabris : zonâ sordidè flavidâ ? peripheriâ pallidâ.

Long. corporis 1 unc. Vidi mortuum at illæsum.

Habitat in brevibus Antillarum rarus.

5. *Cryptoconchus*, Blainv., Burrow, (Nunquam vidi,). (α κρύπτω occulto, et κόγχη concha.) Loricæ scuta mediocria, utrinque dentata,

zonâ tomentosâ obvelata, omnino tecta. Zona (in utroque scuto) fissurâ porisque duobus tubulosis lateralibus signata: supra scutum anticum pori quatuor. Branchiæ abbreviatæ.

Ex. *Ch. porosus*, Burrow.

Has divisiones subgenericas non omnes egomet vidi, at lubenter recepi. Squamæ et sculptura semper oculis armatis examinandæ.

These animals frequent the rocks and stones of the sea-coast, and are distributed nearly over the whole globe. Many of the species are constantly under water, while others ascend above low or even high water-mark, spending the day exposed to the hottest sun, or selecting a resting-place which is only occasionally moistened by the rude and restless surf. In *Chitonellus* and *Cryptoconchus* there are certain minute organs on the zone, which bear a strong resemblance to the spiracula of the annulose animals. From their habit of quitting the watery element, like many of the *Turbinidæ*, I once supposed that the organs for the aeration of the circulating fluid might be of a compound nature, (pulmono-branchiati.) It is, however, far more probable (as in the case of some Crustaceous* genera which I am now investigating,) that this process is capable of a diurnal or a temporary interruption, or that the branchiæ, so long as they are kept moist, and shielded from atmospheric influence, may perform their functions, though much more slowly.

The species are very numerous, but involved in the greatest confusion. As De Blainville has remarked, “ Leur séparation en petits groupes naturels est assez difficile, nous ne doutons cependant pas qu’on y parvienne, si l’on peut réussir à étudier à la fois et complètement les animaux et les coquilles.” From the great variation in their colouring, and the liability of the older shells to become corroded and decorticated by atmospheric exposure, the action of salt water, or the blows of rolling stones, while the spines and other appendages of the zone, are worn

* In the decapod short-tailed *Crustacea* which reside at the bottom of the ocean, the foramina which admit the water to the branchiæ are very large: in the genera which dwell long on land they are contracted. These curious openings, seated at the base of the arms, and closed with a moveable operculiform ciliated *janna*, I have termed *portulæ*.

down or lost, the species are not easily described. There can be no doubt of the necessity of always giving magnified figures and careful details of these animals. An uncoloured outline is also desirable, to shew the peculiar carving of the valves. We might add, with advantage, a profile of the back, and highly magnified figures of the scales, spines, and countless ossicula which beset the inferior adhering surface of the zone, which, added to atmospheric pressure, protect them so effectually from the violent washing of the surf, and the attacks of their countless enemies. The smaller species in particular, without careful line engravings (made with the specimens in sight), it will be difficult to distinguish. Where it is necessary to avoid expense, one half only of the figure might be coloured, while the other might be left to shew the striæ and verrucæ with which the valves are commonly adorned. It would be of great advantage if outlines of the valves, deprived of their connecting ligament, could be also given: the teeth, fissures, and punctures for muscular insertion vary much in the different species, and should be always noticed. Two specimens of each should be sacrificed for this purpose. If left to putrefy in water, or if boiled sufficiently, the fleshy parts are easily separated, and the valves, well cleaned and scraped, may then be gummed in their proper order, with a small interval, on card either white or partially blackened: one of the sets being reversed. With these should be preserved a portion of the detached scales or spines, with a thin slice from the inferior surface of the zone, that they may be submitted to the microscope.

They seem to feed entirely by night. Though they remain stationary during the day, when disturbed they will often creep away with a slow and equal pace, often sliding side-ways, and creeping under the rocks and stones for concealment. If accidentally reversed, they soon recover their position, by violently contorting and undulating the zone; and for defence they sometimes (when detached) roll themselves up like the woodlice. Some of the larger kinds, especially of *Acanthopleura*, are eagerly devoured by the lower orders in the West Indies, who have the folly to call them *beef*: the thick fleshy foot is cut away from the living animal, and swallowed raw, while the viscera are rejected. We have here a large pale *Chiton*, which is said to be poisonous.

The zone of the *Acanthopleura* is often beset with *fuci*, while the

scales of *Chiton*, from their more constant motion, rarely afford a resting-place to the *Serpulæ* and other bodies which are so often dispersed over the broad and solid scuta. The Zoologist, while he takes the size and leading characters of the species from full-grown specimens, will do well to colour from young ones, which are commonly free from any incrustations or injuries. I have observed that some species, of which it is commonly impossible to find specimens not corroded and spoiled, are in certain localities beautifully perfect, and that many species are altogether local, and confined to particular coasts and reefs.

In the 10th number of the Zoological Journal, p. 193, Mr. Frembly has given some of the most interesting observations which have ever been made on these animals. His mode of killing them, however, is very faulty, and would lead to the loss of the greater part of the specimens. Their beauty will in all cases depend on the mode in which they are captured and killed. The finest specimens will of course be those which are preserved in spirit, and exhibit no contraction of the zone. I have, however, been able to dry the whole animal with so great success, that specimens long preserved can scarcely be distinguished from living ones. The capture of them, from the violence of the surf, I have sometimes found a dangerous occupation, the waves having nearly carried me from the rocks. The Naturalist should choose the hour of lowest tide on a calm day, and go prepared with a blunt, round-pointed dinner-knife, a few negro calabashes, or a small keg with a smooth interior, and suspended by a string. These should be half filled with sea-water. Specimens found on smooth stones may, with little force, be slid off into the keg to the sides of which they will immediately attach themselves in their natural position. If they are found on rough coral, or uneven rock, the knife must be *suddenly* inserted under the zone, and the animal turned up : or if the coral be soft, a small chisel may be forced under the spot occupied, and the animal secured without injury. The adhesion, which is slight when they are undisturbed, on the slightest alarm becomes so great, that they cannot, when on hard rocks, be secured without lacerating the sides. By the time they are carried home, all will have attached themselves to the wooden vessel, and the cold water having been poured out, scalding water must be suddenly dashed on them, and not poured gently through a tea-kettle. Few will fall or bend their bodies : as soon

as the water cools they are to be thrown into strong clear spirit for a few days. The flesh is on no account to be removed ; but before being placed to dry, the animals are to be for a moment immersed in spirit, saturated with corrosive sublimate, which insures their safety. They are now to be placed in rows according to their height, and boards or weights of any kind placed on them till they are dry: or they may be pressed between the leaves of an old useless folio volume, the bent specimens being laid in the central groove, which, as it is closed, will restore the natural attitude : when freed from extraneous bodies, they may be gummed on card of various colors, and the natural tints are easily brought out by a brush moistened with pure oil. Nothing can exceed the simplicity of this plan, or the beauty of the specimens which are thus prepared and secured from the attacks of insect enemies and air. Mr. Fremby's plan of suffering them to die gradually in a covered box is subject to great objections. Even in this sultry climate they will live many days, and will require to be often watched : they crowd on the backs of each other for the sake of moisture and coolness, and putridity at last often advances before the animals can be secured.

There is another plan of destroying the *Mollusca*, to which I must call the attention of Zoologists. The examination of Bivalves is attended with the greatest difficulty, from the impossibility, in many cases, of opening the valves without rudely cutting asunder the adductor muscles or breaking the shell at the risk of injuring the inhabitant, or waiting till its death, when it is commonly in a state unfit for examination. I have found that many *Acephala*, which in a damp cellar would survive for weeks, die in a single night if left in stale sea-water, with their valves open, and the animal well extended. Sea-water, when exposed to the sun and stale, in a very short time is fatal to the *Mollusca*, *Crustacea*, and other marine creatures : while it has the advantages of not causing them to throw off their limbs in the agonies of death, or to shorten their retractile organs. Of course the observer will not omit to keep them for a time in water perfectly fresh, and carefully attend to their habits while they continue in health and vigour.

Another plan I have long practised with great success for Land *Mollusca*, and Mr. Gray informs me he has followed it at the British Museum. A glass, or other vessel, with a ground or perfectly even

top, is to be filled with fresh water to overflowing, and the animals thrown into it: they are to be covered over with flat even glass, and in this prison-house they are suffocated and destroyed, the organs remaining extended in their natural attitudes. It is better to use separate glasses, as the animals,* if placed together, by crawling over each other, often in fright retract their organs; and they are to be kept as still as possible. When quite dead, they are to be thrown, without loss of time, into weak, and afterwards stronger spirit: some are to be preserved naked, while the shells of others may be retained, the spire being perforated or cracked, for the admission of the antiseptic fluid to the spiral turns of the abdomen. It does not, however, so well answer for the *Ampullariadæ*, and those genera which possess branchiæ as well as a respiratory cavity (Respiratorium.) On these it would be advisable to try the shock of an electric battery. *Neritinæ* are destroyed with great difficulty: some which were even kept close in salt water seemed to have the power of purifying it, and rendering it fit for respiration, while many large air-bubbles were generated in the glass. Some power of this kind would be very valuable to those species which inhabit maritime ponds, the waters of which, nearly dried up at certain seasons, must be stagnant and unwholesome.

The marine univalves, if kept still in separate vessels thus covered, will die in their natural attitudes, though not without some exceptions, which the zoologist will be taught by experience. All, however, are liable to deceive the operator. Although lying reversed, and apparently lifeless, many, when thrown into spirit, will possess sufficient muscular power to withdraw within the shell, when suddenly stimulated by the ardent spirit. It would be safer to pour off gently the stale sea-water, and to have boiling water dashed on them, to secure the success of the operation.

Many of the minuter shells, as soon as the animal has been described, are to be thrown into spirit, and the operculum in situ may be observed

* In warm countries, if the smaller Land *Mollusca* are captured at a distance from home, they should be placed in tin boxes, with only *damp* leaves, and all water carefully poured out: without this precaution, the steam generated during the night will be fatal to the captives.

at leisure. If the existence of the operculum is doubtful, or the animal has withdrawn itself from sight, a specimen may be fractured and suffered to rot in spring water, when the putrid mass must be carefully washed and examined in a watch-glass. By these means I have detected the spurious operculum in species which I believed possessed it, but in which it could not, in the common way, be detected after the most patient examination. In *Colombella* it is sometimes so minute as to require a sharp eye, or even a magnifier, before it can be found. In such cases it is indeed *spurious*, or only the rudiment of the organ, which may be more perfectly developed in other species, or in kindred genera, which from their economy require an ampler shield against the attacks of enemies.

We are apt, however, to make use of this word *spurious* without sufficient consideration. We should recollect, when wondering at the smallness or weakness of the horny opercula of some *Mollusca*, that the species which possess such either live under the sand, reside in safety on the coasts, or quit the waters when they are not feeding, the shell being held down close to the rocks by a dried mucous secretion, as in some *Turbinidæ*, or by the mere adhesion of the foot, as in *Purpura*, &c. The operculum, which in many cases would not close the expanded aperture, is only brought into use in cases of great peril, when the hold of the adhesive foot is loosened, the vessels are emptied of mucus, the various secretions, or the poisonous or coloured fluids by which the enemy is to be driven back or baffled, and the animal retires into the narrower whorls, for which alone the operculum is fitted. When the operculum is perfectly solid and testaceous, we may be sure that its possessor commonly resides in places where it is subject to the sudden attacks of dangerous pursuers. Here it will be of ample size, and capable of closing the larger and exterior whorl. The structure and composition of this organ indicates the habits of the inhabitant in so many cases, that its value in generic characters is far greater than many are willing to allow.

Before concluding these notes on the *Chitonidæ*, I cannot refrain from again referring to the complex and wonderful organs of the mouth for comminuting the food. The Palato-œsophagal membrane, when the animal is plunged into boiling water, is easily detached, and forms a beautiful and interesting object for the microscope. The anterior termination is expanded

into a denticulate palate, while the broad naked alæ are reflected over the singular organs which supply the place of the under jaw of the *Mammalia*. The inferior portion is folded into a half-closed tube, resembling the trachea of birds, from the two lines of external sloping parallel tendons, which give motion to each molar tooth-like process, as they are set in action to grind the food and pass it into the stomach. The tongue is minute, lobate at the tip, and terminates this singular organ, to which the name of *Trachyderma* is now given. We easily see why the termination is not closed into a perfect tube, as this structure would have interfered with the necessary degree of motion required for the teeth. In other *Mollusca* the organs I have called *Siagonia*, from their use, are often quadrate cartilaginous bodies; here they are represented by two large elongate bladders, composed of a white tough skin, and most tightly distended with a transparent fluid, so as to give them almost the strength of cartilage. Their bases are distant, while the apices are brought together under the alate processes of the palate, and set in motion by an apparatus of strong and numerous muscles, as we see in the very satisfactory outlines given by Cuvier.

I hope soon to have opportunities of publishing, in some work or other, figures of the many beautiful species which inhabit the Caribbean Sea.

St. Vincent, May 1, 1829.

ART. VIII. *Descriptions of a new genus of Hemiptera, and of a species of Hegeter.* By C. HEINEKEN, M.D., &c. In a Letter to the Editor.

TO THE EDITOR OF THE ZOOLOGICAL JOURNAL.

SIR,

THE first of the two following insects appears to me to have been hitherto undescribed, and to constitute an intermediate genus between *Ploiaria* and the section *Ploteres* of the "Genera, &c." of Latreille; and the second to be a new species of his genus *Hegeter*. As, however,

my means of reference are very limited, and as it is several years since I have seen any collection of insects, excepting a very small and local one of my own, I may be deceived; in that case the details which I have given, will, perhaps, compensate for the failure of my attempt to contribute something new.

I am, SIR,

Your obedient Servant,

Funchal, Madeira,

C. HEINEKEN, M. D.

25th April, 1829.

Order. Hemiptera.

Section. Heteroptera, (Kirby, Leach.)

Family. Geocorisæ, (Latreille.)

Tribe. Nudicolles, (Latreille.)

Genus. Cerascopus, (nobis.)

Corpus elongato-clavatum, membranaceum. *Elytra* alæque nullæ. *Caput* elongato-ovatum, bilobatum. *Ocelli* nulli. *Antennæ* corporis saltem longitudine, geniculatæ, filiformes (articulo 1mo aliis longiore et arcuato) ante oculos, et supra lineam ab iis usque ad rostri originem ductam, insertæ. *Rostrum* articulo secundo mediove aliis planè brevior. *Thorax* elongatus, inæqualis, bipartitus. *Pedes* antici raptorii coxis elongatis, intermedii et postici (quorum hi longiores) longissimi, graciles, filiformes. *Abdomen* clavatum, depressum, segmentis falsis. *Genitalia* exserta.

Cerascopus marginatus.

Length about four lines. *Colour* dingy yellowish brown, interspersed with umber. *Legs* and *antennæ* of the latter colour with pallid articulations. *Thighs* and *tibiæ* of raptorious legs spotted with umber, and two interrupted central and one marginal line of the same on the *abdomen*, which is depressed above with an elevated margin and six false segments; smooth, entire, slightly convex, and of a pale yellow colour, beneath. *Eyes* black. *Head* divided into two unequal lobes, by a transverse depression between the eyes. First joint of *antennæ* as long (or nearly) as the two next, and bowed forwards; fourth somewhat the shortest, and suddenly tapering to a fine conical point. *Thorax* unequally divided by

a constriction and depression just before the second pair of legs: posterior division elongate and irregular in figure and surface, in consequence of the articulations of the legs; anterior rather linear and giving origin to the raptorious legs at its anterior extremity. *Tarsi* of the latter gradually and finely pointed, and slightly curved inward, and together with the *tibiæ* received into a groove between two rows of spines and a strong prominent curved spur at their termination on the thighs. Second joint of the tarsi of the other legs shortest, and third longest. Three joints in all, with two curved, simple, exserted terminal claws.

Genitalia ♀ in statu quiescente adeo compressa ut vix investigari queant; nec in coitu observare contigit.

Genitalia ♂ distincta, extantia, antrorsum sursumque flexa. *Penis* membranaceus, pellucidus, truncatus, inter crura *prehensorum* (quorum duo laterales appositi, alter inferior posticus) exsertus. *De coitu*, semel tantum viso, tam ob brevissimum spatium temporis quo peractum est, quam ob difficilem observandi rationem (insectis vase vitreo inclusis), hæc tantum quoad *partes* observata sunt: scilicet, cruribus prehensorum expansis vel divaricantibus, penem deinde extensum fuisse; interea, pedibus raptoriis feminae utrisque ab alterutro maris comprehensis, thoracem ejus amplexus corpusque incurvans, coitur. Alio tempore fefellit marem spes pedes raptorios feminae comprehendendi; illa itaque evasit. Illa quidem semper invita, idcirco nonnihil periculi respicere marem videtur; quippe post coitum sese invicem vitant, nec (ut semel ambobus in vase relictis) aliquando femina marem necare recusat. Coitum cum femina gravidâ semel a mare inceptum vidi, sed infelici casu: ex hoc patet, marem nisi experiendo feminae affectus nescire. Quartâ circiter hebdomadâ post coitum, ♀ ponit ova, ovalia, albida, pellucida, vasi adhærentia, dispersa, numero incerta, larvis decimam post diem exclusis: impregnatione unâ ad tres quatuorve ovorum depositiones sufficiente. *Metamorphosis* nulla aut valdè indistincta.

The insect is found from March to December (seldom if ever during the intermediate months) stalking on the walls of rooms, and almost invariably after dusk; those in confinement are more or less torpid during the day. The motion when the pace is quickened, or when about to take prey, is more elastic and librating (if the term be allowable) than tremulous and vibratory, so that it cannot be strictly called *tipulous*; it

resembles the poising motion of a rope-dancer more than any thing else. The antennæ are invariably used (bent to a certain angle) for touching the prey, and measuring its distance apparently, before it is seized. I never saw a fly taken by it without this previous operation, and once, when one was dropped close to the insect, they were bent at a more acute angle than usual, and the stroke failed; retreating a little, the angle was increased, and the fly taken. They are always in a state of slow up and down motion, and are used as tactors and explorers upon all occasions; touching either another animal or one of the same species with a leg accidentally seems to be hardly perceived, but the instant an antenna comes in contact with any thing, the insect suddenly darts back. They seem in a great degree too to supply the place of sight, which I suspect, although the eyes are of proportionate size, to be but limited, for after remaining quietly within a moderate sphere of vision from one of its own species, it starts off as though suddenly alarmed, upon the slightest contact. I have removed both from several individuals, and never saw them attempt to seize any thing afterwards. They invariably died, and I should say not from the mutilation, but the privation of food. When only one is removed, in some instances that which remains is clumsily made use of, but seldom efficaciously. Death sooner or later is the consequence, the abdomen is shrivelled and collapsed from lack of nourishment, the animal continuing as active as one with entire antennæ, but either deprived of, or refusing food. The legs are not deciduous, and I have never seen a limb reproduced; this however, has not been fairly tried. It is the most unsparing and indiscriminate destroyer and devourer of its own species that I have ever met with. Spiders will kill, but rarely if ever suck, one another and their mates; but I have never succeeded by keeping all other food from them, (and the trial has been made frequently and for long periods) in inducing them to kill their own offspring, or indeed the very young of another of their own species; but a female *Cerascopus* killed and sucked a companion of the same sex, her own mate, and, after only a few days' fast, her own young, and sucked her own eggs! They generally appear early in March, and I have now (April) one beginning to lay. Two summers ago one received the male in July, laid four batches of eggs at nearly equal periods between that time and November, and died, although used to confinement and well fed, early in December.

The only family of Latreille's "Genera, &c." which will admit this insect is the second, *Cimicides*. From the section *Ploteres* it is excluded by its habits (which are strictly those of a land and in-door animal), its claws, *antennæ* and *rostrum*. From the section *Acanthillæ*, every thing is exclusive: and it can only be admitted within that of *Reduviini* by a little accommodation. This section contains four genera, viz. *Nabis*, *Reduvius*, *Zelus* and *Ploiaria*. In *Nabis* the body is "conico-ovate," the legs "not long," the *coxæ* "short," the insertion of the *antennæ* is "beneath," and the first joint of the *rostrum* is "not longer than the second." In *Reduvius* there are the additional discrepancies of the second joint of the *rostrum* "the longest," and the presence of "ocelli." Of *Zelus* and *Ploiaria*, no generic characters are given; I therefore conclude that they are amenable to those of their predecessor *Reduvius*, but in the "Histoire Naturelle, &c." the distinguishing character of *Zelus* is "pattes simples, ni ravisseuses, ni très-courtes," and the *Ploiaria* there have "le corps long et étroit," "de petits yeux lisses," and "le corselet assez plat en dessus se rétrécissant et diminuant d'épaisseur de son bord postérieur à celui de devant." When therefore, in addition to all this, it is excluded for equally good reasons from the numerous genera, either invented or adopted by Leach, which Samouelle has given; and possesses the peculiarities of not even the rudiments (as far as I can ascertain) of *elytra* or wings, of a bowed first joint to the *antennæ*, of using these members as tactors, measurers and explorers, of the second joint of the *rostrum* being palpably the shortest, and of exerted and complicated organs of generation; I hope, that even in this genus-making age, I shall be held justified in offering my small "sum of more, to that which had too much." Two genera (*Holoptile* and *Pétalocheire*) are given in the "Familles Nat. &c." with which I am perfectly unacquainted; should our insect belong to either of them, the name which I have intended as a generic, may easily be converted into a specific one. The details which I have added can in neither case do harm. *

* Dr. Heineken's insect cannot be an *Holoptilus*, Lepel. and Serv., the *antennæ* in that genus being only three-jointed, with the last two joints feathered with long hairs; nor a *Petalochirus*, Pal. de Beauvoir, in which the body is not linear, the legs of only moderate length, and the anterior *tibia* dilated into the form of a shield. Its nearest relation is to *Ploiaria*, in which

40 Dr. Heineken's *Description of Hegeter Webbianus*.

TAB. II. Fig. 5. A *Female*. It is somewhat magnified, and the thighs are proportionally rather too short. The *Male* has a narrower abdomen, and the sexual organs bent upwards and forwards. The *Young* differ only in being more linear, smaller, lighter in colour and less distinctly marked. The false segments are also obsolete, or nearly so.

HEGETER. (Latreille, *Genera, &c.* vol. 2, p. 156.)

Heg. Webbianus. (nob.)

Ater, obscurus; labro, palporum maxillarium antennarumque apicibus fuscis; capite thoraceque lævibus impunctatis; thorace *posticè subsinuato* et ad latera *posticè leviter* marginato, angulis acutis; scutello lineari transverso; elytris basi et externè marginatis, *obsoletissimè* subsulcatis. Longitudine $4\frac{1}{2}$ lineis.

Habitat in Insulâ Nivariâ.

The above insect was sent to me a few weeks back from Teneriffe, by my friend Mr. Webb, (after whom I propose, should it prove new, to name it), but I have not yet learnt any particulars of its habits. It is so precisely in every respect a *Hegeter* of Latreille, that it would be useless either to figure or minutely describe it. Indeed excepting in size ($4\frac{1}{2}$ instead of $8\frac{1}{3}$ lines), in having the grooves of the *elytra* but just discernible, in the *elytra* diminishing more gradually in width towards the thorax, and in the latter being subsinuated behind, and less palpably marginated, it approximates so nearly to his *Heg. striatus*, that, with the addition of the *few words in italics*, the specific character given above is *verbatim* that of the *striatus* in the "*Genera, &c.*" And as I conclude the latter, both from its having led to the formation of the genus, and from Lamarck designating it "*Ahis Hegeter*," to be the only known species, I have ventured ours in addition.

genus the Rev. Mr. Kirby, to whom the description and figure have been submitted, is disposed to place it. "If you examine," he says "the true "*Ploiaria vagabunda*, you will find that it has a bilobed head as in fig. 5. *a.* " and that the *antennæ*, *rostrum*, and fore legs, are precisely similar. In fact " there is no prominent difference except that the Madeira species is apterous." Ed.

Note on the Hegeter Webbianus. By the Rev. W. KIRBY.

I have great doubts whether this insect is distinct from *Heg. striatus*. Latreille gives Teneriffe as its habitat, and describes the elytra as *subsulcata*, which indicates that they are *slightly* furrowed. I have a specimen from Madeira only six lines long, which brings it near Mr. Webb's specimens, and the thorax is subsinuated behind; so that there remains scarcely any distinction except that of size, now reduced, and that the elytra instead of *subsulcata* are *obsoletissimè subsulcata*, which may be casual.

ART. IX. *On Cermatia. By C. HEINEKEN, M.D., &c.*

LATREILLE cautions the entomological aspirant against making even a species ("même une espèce"), "sans y avoir mûrement réfléchi;" but as I am not aware that equal forbearance is either expected or requisite in the unmaking process, I may perhaps be allowed the attempt, even though it should appear that I have not "maturely" considered the subject: a condition much more easily fulfilled to our own content, than to the satisfaction of others.

In the third volume of the Zoological Miscellany, page 38, is a description of the *Cermatia livida*, and No. 136 is the plate of the same. Madeira is given for its habitat, and as in the course of several years, and amongst some dozens of specimens either seen or preserved by me, (they are common in our houses,) not even a variety has occurred, I think I need not hesitate in saying that we have only one species of *Cermatia*, and consequently that the *Cermatia livida* of Dr. Leach is that one.

Fig. *a* of the accompanying Plate [TAB. II. fig. 6.] is our *Cermatia* when alive, and it will readily be conceived that I was not a little puzzled to reconcile it with either the description or figure in the Miscellany. However, upon examining some which had been for a length of time preserved in spirits, and then exposed to the air for a few hours, as I suppose Dr. Leach's to have been before the drawing was made, I found them as represented by Fig. *b*; and as they then agreed with the description, and corresponded

with the figure (which I suspect to be far from an accurate one) at least as well as that description did, I felt perfectly satisfied; and although Dr. Leach hinted a suspicion that his *Cerm. livida* and the *Scolopendra coleoptrata* of Linnæus might be the same, yet as he appeared unable to determine the matter, I thought it by no means probable that I should succeed, and therefore took the negative for granted. Happening, however, a short time since to meet with a new species in Risso's "Histoire Naturelle," &c. Vol. V. p. 153, which he had named *Cermatia variegata*, and finding that ours answered to its description, I was led to prosecute the inquiry; and the result is, (as I hope to prove,) that the *Scolopendra coleoptrata* of Linnæus,—the *Scutigera longipes* and *coleoptrata* of Lamarck,—the *Scut. araneoides* of Latreille,—the *Cermatia livida* of Leach, and the *Cerm. variegata* of Risso, are one and the same, and identical with ours.

As I have not any of the works referred to by Lamarck and Latreille, I am obliged to adopt one of their species as a standard, and by identifying ours with that species, to assume its correspondence with the synonyms. I shall take Latreille's *Scut. araneoides*.

In his "Histoire Naturelle," &c. Vol. VII, p. 86, &c. he says, "Les palpes maxillaires sont longs et épineux"—"le corps a, outre les petits anneaux dont je viens de parler, sept autres recouverts chacun en dessus d'une plaque bien terminée dans les contours, comme un petit bouclier, presque carrée, avec le bord postérieur arrondi aux angles, échancré au milieu, et ayant dans ce sinus une petite fissure, dont les bords étant un peu relevés semblent représenter une espèce de stigmaté," &c. &c. &c.—"Les trois premières plaques, a commencer par la tête, sont un peu plus courtes et la quatrième est la plus longue. Linnæus et Pallas en comptent huit. Je crois que la huitième doit être censée faire partie de l'espèce de petite queue qui résulte des segments terminaux sans pattes."—"Les pattes sont beaucoup plus longues que dans ces insectes (les Scolopendres) et par la figure de leurs articles se rapprochent de celles des Faucheurs, &c. &c. Les six dernières paires, et surtout les terminales, sont plus longues que les huit premières, &c. Les tarses sont fort longs, composés d'une infinité d'articles se roulant sur eux-mêmes a leur extrémité," &c. &c.—"On trouve la *S. arane*-oïde dans les maisons."—This I am aware is his generic description,

but as it appears to have been taken from a single species, (the *Scol. coleoptrata* of Linnæus), and is so minute, I have selected such parts as more especially elucidate the species, of which his essential characters are the following—"14 paires de pattes ; corps jaune roussâtre, avec trois lignes d'un noir bleuâtre le long du dos, et des fascies de la même couleur sur les cuisses." In the "Genera Crustac.," &c. Vol. I, p. 77, published subsequently to the *Histoire*, he says, "Pedibus triginta ; corpore rufo-flavescente, lineis longitudinalibus pedumque fasciis cæruleo-nigris:" and whoever compares these descriptions with Fig. *a*, will at once, I think, agree that ours is the *Scut. araneoïdes* of Latreille. The following is the list of synonyms in the "Genera:" "Scutigère araneoïde Lat., *Hist. Vol. VII*, p. 88.—*Scolopendra coleoptrata*, Linn., *Syst. Nat. ed. 13, Vol. I, pars 2, pag. 3015*.—La Scolopendre à 28 pattes, Geoff., *Hist. des insect. Vol. II*, p. 675.—*Julus araneoïdes*, Pall., *Spic. Zool. fasc. 9, tab. 4, fig. 16*.—*Scolopendra coleoptrata*, Fab., *Entom. Syst. Vol. II*, p. 389, and Panz., *Faun. insect. Germ. fasc. 50, fig. 12*." The synonyms given by Lamarck (*Animaux sans Vertèbres*, Vol. V, p. 29,) of his *Scut. longipes*, are, *Scolopendre a 28 pattes*, Geoff., *Vol. II*, p. 675, No. 2, and *Julus araneoïdes*? Pall., *Spic. Zool. 9, p. 85, t. 4, f. 16*: and of his *Scut. coleoptrata*, *Scolopendra coleoptrata*, Panz., *fasc. 50, t. 12*, clearly identifying his two species with Latreille's *araneoïdes*. Dr. Leach's essential characters are, "Corpore livido ; pedibus luteis:" "few, and far between," it is true, but sufficient when backed by the habitat, to leave no doubt as to its being our Fig. *b*. "Corpore flavescente, glauco ; dorso lineis tribus longitudinalibus purpureo-nigris, unâ centrali, duabus lateralibus e maculis constantibus ; antennis croceis, pallidis ; pedibus flavescenti-glaucis, violascenti annulatis ; oculis atris," are the very words in which I should have thought that I had happily described our Fig. *a*. They are Risso's description of his *Cerm. variegata*. I should perhaps have added, *incisuris (scutellorum marginibus) pallidis*; but as Dr. Leach has not noticed them in his description, although they are shewn in the figure, and as Latreille only says in the generic characters, "les bords semblent représenter une espèce de stigmaté," I conclude, either that Risso overlooked them in his species, or considered them of no consequence ; that they really are immaterial, or that they are strictly generic marks.

That Lamarck's *Scut. longipes* and *coleoptrata* and Latreille's *Scut. araneoides* are the same, is evident from the correspondence of their synonyms. Latreille himself considers his *Scut. araneoides* and Linnæus's *Scol. coleoptrata* as identical, and adopts *araneoides*, "le nom spécifique de Linnæus rentrant dans celui du genre;" and a comparison of the different descriptions with the figures, cannot fail to shew that ours is the *Scut. araneoides*, *livida*, and *variegata* of their respective authors. I suspect, from its omission in the "Genera," that Latreille considers the *longicornis* of his "Histoire," synonymous with the *araneoides*; and as Lamarck says of his *longicornis*, "est elle vraiment distincte de la précédente?" (the *longipes*) it may perhaps turn out, after all, that there is only one well-known and established species of *Scutigera*, namely, the *Scolopendra coleoptrata* of Linnæus.

Funchal, Madeira, Feb. 10, 1829.

P. S. I am indebted to a friend for the drawings, and I mention this because, in addition to their being better than my own would have been, he is not interested either in the branch of science to which they refer, or the subject of discussion which they are intended to elucidate; his pencil is therefore more likely to have been unprejudiced. Fig. *b.* was sketched from the same animal as Fig. *a.*, but coloured from one which had been long in spirits and afterwards exposed to the air for two or three hours.

ART. X. *Description of two new Species of Buccinum from the English and Irish Seas.* By W. J. BRODERIP, Esq., F.R.S., &c., Sec. G.S.

BUCCINUM ACUMINATUM.

B. testâ conico-subulatâ, albâ, anfractibus 10, ultimo angulato, striis elevatis intermediisque minoribus annulosis et granulosis; epidermide fuscâ; columellâ uniplicatâ; sulco basali et canali magnis; long. unc. 4 $\frac{7}{10}$, lat. 2.

Hab. in Oceano Britannico.

Mus. Sowerby.

TAB. III. fig. 1, 2.

Shell white, or brownish-white, of a conical-subulate shape, tapering gradually from the angle of the body-whorl to the acuminate apex. The whole of the ten whorls are ringed with elevated striæ, which, together with those which are intermediate and less elevated, have a granular appearance. The epidermis is brown. The mouth is milk-white, with the edge of the lip a little reflected, and the pillar strongly marked with one plait in the advanced stage of growth. The basal furrow is deep, and the canal large.

This fine and interesting addition to our British Mollusca was dredged off Torquay by a fisherman, in a boat wherein was Viscount Kilcourse, the late proprietor of the shell. In its outline it approaches to *Terebra*. It is very different from *B. glaciale*, with which species it was confounded by some of those who had an opportunity of seeing the shell in Lord Kilcourse's cabinet. The animal was alive when it was brought into the boat, and it is very much to be regretted that it was not preserved with the operculum.

I have seen two other specimens of this shell. One much younger, in which the angle of the body-whorl is not yet developed, and the plait on the pillar is only just beginning to appear; though the other characters are as clearly marked as they are in the figured specimen. The other, a very young shell, is much distorted by a mal-formation of the whorls at the suture; but the general contour and character of the species is preserved.

BUCCINUM FUSIFORME.

B. testâ ovato-oblongâ, fusiformi, albâ, anfractibus 7 ventricosis, longitudinaliter creberrimè costatis et transversim striatis, costis subgranulosis; columellâ lævi; long. $1\frac{1}{4}$, lat. $\frac{5}{8}$, unc.

Hab. in Mari Hibernico.

Mus. Bennett, J. Sowerby.

TAB. III. fig. 3.

Shell ovate-oblong, fusiform, white: whorls seven, ventricose, with numerous longitudinal subgranulose ribs, crossed by frequent transverse striæ. The ribs cease upon the lower part of the body-whorl, leaving the base simply striated transversely. The pillar is smooth. The specimen from which the description was taken was found by Mr. J. Hum-

46 Mr. Broderip and Mr. G. B. Sowerby on *Mollusca*.

phreys, near Cork. I have before me another individual of larger size (one inch $\frac{7}{8}$ long, and about $\frac{7}{8}$ of an inch broad), but it is very much worn. This last came from the collection of Mr. Bennett. The species approaches in general appearance to some of those *Fusi* which have a short canal.

ART. XI. *Observations on new or interesting Mollusca, contained, for the most part, in the Museum of the Zoological Society.* By W. J. BRODERIP, Esq., F.R.S., &c., Sec. G.S., and G. B. SOWERBY, F.L.S., &c.

(Continued from Vol. IV. p. 379.)

Group.

Tunicata.

Family.

*** ?

Genus.

CHELYOSOMA.

Corpus sessile, fixum testâ coriaceâ supernè diviso-laminatâ indutum.
Orificia conica, utrumque valvulis 6 trigonis clausum.

Specific Character.

CHELYOSOMA MACLEAYANUM.

Ch. elongato-ovatum, basi affixum, supernè planum, octopartitum, laminis striatis, orificiis prominentibus.

Hab. in Oceano Arctico, saxis adhærens.

TAB. III. fig. 4, 5, 6.

This extraordinary inhabitant of the Arctic Seas appears to differ from any of the Tunicata already described. It comes nearest to those Mollusca which form Mr. MacLeay's group *Tethya*, but there are no traces of tentacula surrounding the branchial orifice. From the *Thalida* it differs, inasmuch as the mantle seems to adhere to the orifices only, and, instead of a simple valvule, each orifice of *Chelyosoma* is furnished with a complicated one. From the *Ascididæ*, the only simple and fixed family of the *Tethya*, according to MacLeay, it differs, inasmuch as both its orifices are surrounded by six valves, instead of being quadrifid.

Having thus endeavoured to shew the necessity of establishing a new genus at least, if not a new family, let us proceed to describe the animal. There were four specimens, one of which was sacrificed to the inquiry; but decomposition was so far advanced that the ovaries and other viscera were nearly reduced to a shapeless pulp, and we could only trace those parts of the internal structure, which we proceed to lay before our readers.* The mantle appears to adhere only to the orifices, each of which consists of six triangular valvules. Each valvule is furnished with a set of muscular fibres, adhering at one end to the inner surface of the tunic (not of the mantle) and at the other extremity to a small papillary process on the valvule. These muscles appear to be the agents for opening and shutting the valvules. Besides this set of muscular fibres and within them there is another set, which passes laterally from one papilla to another, forming a sphincter, the base of which is hexagonal. [TAB. III. fig. 6.] There are other strong subcutaneous muscular fibres, passing from the edge of the upper part of the tunic to that of the lower, and also from the edge of each of the coriaceous plates which form the upper surface. These appear to be intended to give the animal the power of dilatation and contraction. Externally, the animal is of an oblong cup-shape, adhering by coriaceous processes from the lower part of the cup. The upper surface, which is flat, consists of eight coriaceous, somewhat horny, angular plates. One of these is placed between the two orifices, and, in four specimens which were examined, this was of an hexagonal shape, the sides coming in contact with the orificial valvules being lunated. The plates are so disposed that the branchial orifice is surrounded by three plates, and the anal orifice by four, besides that which is intermediate and abuts upon both. The three plates near the branchial orifice are much larger than the four which are near to the anal orifice. Each of the plates is marked with three or four elevated striæ, parallel to the sides of the plate, and near to them, leaving an area in

* The decomposition, which prevented any thing like an accurate demonstration of the ovaries and other viscera, was, apparently, occasioned by the spirit in which the specimen was preserved not having sufficiently penetrated to the internal parts. This is mentioned, in order to draw the attention of collectors to the necessity of puncturing the external integuments, muscular coats, &c. of such animals as are plunged entire into spirit, in order that it may reach and preserve the viscera.

the centre, and bearing a striking general resemblance to the external plates of a Land-tortoise's shell. The orifices are very small, and are surrounded by six triangular valvules, each transversely striated, and when shut, rising from the surrounding surface in the form of a cone. The lower or cup-like part is formed of a coriaceous substance, with *slight* traces of separation into plates, but without internal muscular fibre. In one specimen only there were two irregular somewhat horny plates at the external base of the cup, but not so strongly marked as the upper plates. These lower plates were not to be observed in another specimen which was removed for the purpose of examination from the stone to which it was fixed.

The learned and accurate anatomical observations on the natural group of Tunicata, by William Sharpe MacLeay, Esq., (Linn. Trans. Vol. XIV. p. 527.) have done so much in elucidation of the hitherto obscure structure of many of these animals, that the specific name above recorded is but a small tribute to the author of such a valuable memoir.

DENTALIUM FILOSUM.

D. testâ gracili, tenui, albâ, filis octo longitudinalibus, striis transversis creberrimis; long. $2\frac{9}{10}$ poll. lat. $\frac{2}{10}$ poll.

Hab. ad littora maris ad Tennasserim.

Distinguished from *D. octogonum*, by its much more slender shape, and its thinner shell; instead of the eight angles of that species, it has eight distinct, raised, longitudinal threads. Three specimens of this fine species were lately brought to England by Mr. Hay, who himself picked them up on the coast of Tennasserim.

CYTHEREA PLANULATA.

C. testâ trigonâ, depressiusculâ, subæquilaterali; angulis inferioribus rotundatis; pallidè flavicante, radiis numerosis fusciscentibus; intus albida, fusco-violaceo varid; dente postico remoto; long. $1\frac{9}{10}$ poll. lat. $\frac{7}{10}$ poll. alt. $1\frac{9}{10}$ poll.

Hab. in littoribus Oceani Pacifici, prope Mazatlan.

A pretty species of Cytherea, which has so much of the general ap-

pearance of a *Mactra*, that it might at first sight be easily mistaken for one. In form it is triangular, nearly equilateral, and somewhat depressed; its base and lower angles are rounded: it is of a pale yellowish colour, with many diverging fuscous rays: within it is white, varied with brownish violet, and its posterior cardinal tooth is unusually remote.

VENUS DECORATA.

[TAB. SUPP. XL. f. 3.]

V. testâ cordato-trigondâ, latere postico productione, albâ, liris longitudinalibus crenulatis sulcisque radiantibus decussatis granulosa, margine crenulato.

Habitat?

This highly decorated shell (the only specimen we have seen) bears some resemblance in its outward ornament to *Arca gradata*. It was brought home in the Blossom. In Mr. Sowerby's collection.

BULINUS BILABIATUS.

[TAB. SUPP. XL. f. 1, 2.]

B. testâ acuminato-ovali, anfractibus 5, (ultimo ad basin angulato) costis elevatis obliquis distantibus, pallide fuscâ; aperturâ auriculari, peristomate reflexo, sinuoso, pone labium lamellifero; columellâ obtusè uniplicatâ.

Hab. in Brasiliâ.

We have placed this extraordinary shell under the genus *Bulinus*, being unwilling to add to the list of generic names till we are compelled to do so. But the species is so intermediate in its character between the *Auriculæ* and the *Bulini*, that it might be referred to either with little violence. The mouth of the shell, as well as its general appearance, is unlike that of any of the *Testacea* which we have seen. At a little distance behind the reflected lip rises a shelly plate, which in an earlier state of its existence appears to have formed the right side of the aperture. We have only seen two specimens; but both of these have the same formation which does not seem to be accidental. In the collections of Mr. Bland and Mr. Sowerby.

Both specimens appear to have suffered by exposure to the weather.

50 Mr. Broderip and Mr. G. B. Sowerby on *Mollusca*.

CYCLOSTOMA RAFFLESII.

C. testâ spirâ depressiusculâ, anfractibus quatuor rotundatis, supernè striatis, carinis 4 ad 6; umbilico magno; aperturâ orbiculari, peristomate reflexo; long. $1\frac{3}{10}$ poll. lat. 2 poll.

Hab. in Sumatra.

The first specimens we saw of this fine *Cyclostoma* were brought to England by Sir Thomas Stamford Raffles, in honour of whom we have named the species. Its upper side is of a fine chestnut colour, prettily varied with white. In its very young state it is quite destitute of the keels, but has only close-set transverse striæ: the reflected lip is sometimes of a light orange brown colour.

CYCLOSTOMA PERDIX.

C. testâ spirâ depressiusculâ, acuminatâ, anfractibus quatuor, leviter striatis; carinâ mediâ, ætate oblitteratâ; aperturâ amplâ, peristomate reflexo; umbilico mediocri; long. $\frac{9}{10}$ poll. lat. $1\frac{5}{10}$ poll.

Hab. in Tennasserim.

A very elegant species, of which a single specimen was brought to England by Mr. Hay, who found it alive in Tennasserim, not far from the shore. It is of a dark chestnut colour, mottled with white, and there is a sutural band of chestnut articulated with white. We have met with other specimens which show that the keel, which is always sharper in the young shell than when at its full growth, is sometimes not developed at an early period.

CONUS SOLANDRI.

[TAB. SUPP. XL. f. 4.]

C. testâ cylindraceo-turbinatâ, subcoronatâ, striis transversis frequentibus, basalibus granulosis, fulvâ, fasciâ mediâ albâ, castaneo maculatâ et punctatâ; spirâ mediocri, striatâ.

Hab. ad Taheite.

The specimens of this pretty Cone, which were brought home in the Endeavour, are in a very bad state, the points of the spires being ground off, apparently for the purpose of stringing them. They are labelled, "Otaheite," in Dr. Solander's hand-writing. Our specimen, which is in high perfection, was brought home in the Blossom; but we know not where it was found. In Mr. Sowerby's collection.

CONUS CYLINDRACEUS.*

[TAB. SUPP. XL. f. 5.]

C. testâ cylindraceo-fusiformi, lavigatâ, transversim leviter striatâ, striis inferioribus fortioribus, granulosis; spirâ rotundato-pyramidatâ, mucronatâ; colore pallidè fulvo, albo vario.

Habitat?

A single specimen of this curious Cone has come to our hands; it was brought by the Blossom. In its outline it approaches nearest to *C. mitratus* of Lam., and bears a great resemblance to a *Terebellum*. It is of a pale fulvous colour, having two transverse rows of very irregular white blotches, and several distant and irregular longitudinal white stripes.

(To be continued.)

ART. XII. *Observations upon Volvox Globator. Communicated by W. J. BRODERIP, Esq, F.R.S., &c., Sec. G.S.*

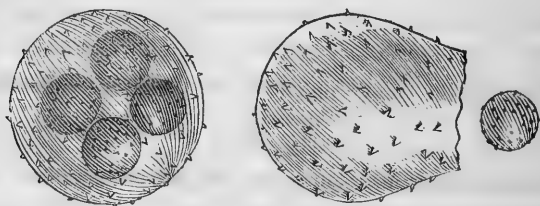
I have received from Mr. Stokes the following remarks upon *Volvox Globator*, which will, I think, be interesting to Naturalists.

On the 10th of August, 1828, while observing some aquatic animalcules under a microscope, his attention was particularly attracted by a specimen of *Volvox Globator* of larger size than usual, and remarkable as containing four distinct green globules within it. These, on examination, appeared to be young ones, perfectly formed and quite in contact with each other.

* In reference to a shell, named by us *Conus interruptus*, in the 4th volume of this Journal, page 379, we have to observe, that soon after the publication of that number we found a very different shell figured under the same name, but without any description, in the Supplement to Mr. Wood's Index Testaceologicus. Upon examining an individual furnished by Mrs. Mawe (from whose cabinet the shell figured by Mr. Wood is said to have been taken) we have no hesitation in stating our opinion that it is only a variety of *Conus nebulosus* of Solander and Lamarck. Our *Conus interruptus* may, therefore, as it appears to us, retain its name.

Their spines were clearly developed, and appeared more closely set than in the specimens usually met with; and this circumstance, connected with their darker colour, suggests the idea, that the outer membrane or integument of the animal is distended as it increases in size. The parent animal was unusually large and transparent, and almost colourless, as if by distention, and the spines were proportionately more distant so as to confirm this supposition: its motion was much more languid than usual.

After a time the glass, containing this individual, was removed in order to place other objects under the microscope. It was soon however remarked, that two of the small ones were separated and moving about in the glass, which was in consequence immediately replaced for observation. The larger Volvox now shewed an opening or laceration on one side, which was always hindmost as the animalcule moved; and its shape was as here represented.



The other two small ones soon passed through the opening, when they immediately moved freely in the usual manner of these animalcules, and with a rapidity strongly contrasted to the languid motion of the parent, which continued to move as before, and its transparency was such, that it was not possible to define the edge of the lacerated part between the spines. The closest attention and variation of the light did not detect any appearance whatever of internal organization. After an hour had elapsed the observations were discontinued, but during that period the motion was uninterrupted, and there did not appear any tendency in the lacerated part to collapse or alter its form. On examining many individuals which contained young ones of different sizes, it appeared that the young proceeded from points on the internal surface, to which, as in other gemmiparous animals, they remained attached while continuing to grow. The number of young varied in different individuals, from two to five.

W. J. B.

ART. XIII. *Observations upon the Genus of Coleopterous Insects, Ctenostoma of Klug, and its Species. By J. O. WESTWOOD, Esq., F. L. S., &c.*

Order. COLEOPTERA.

Fam. CICINDELIDÆ.

Genus. *Ctenostoma*. Klug, Latr., Dej.

Caris. Fischer. *Collyris*, p. Fabr.

THE principal generic characters of this group have been detailed by Dejean, in his *Species General*, &c., Vol. I. p. 152, and by Klug in the *Berlin Transactions*. The following observations principally suggested by the possession of the sexes of one of the species may however be added.

The upper lip (labrum) of the female is more advanced in front than that of the male, and is furnished with a small tooth at each side, and three in front, the centre one of which is almost obliterated in the male. The figure of the upper lip of *Ct. trinotatum*, given by Fischer in his *Genera*, Tab. 1, f. 8, is very incorrect.

Fischer and Latreille describe these insects as apterous, and Klug as being furnished with moderate sized wings. Dejean (having only a single specimen of each of the three species) states his unwillingness to sacrifice them to verify the fact. Without, however, injuring my specimens, I have discovered that the males are furnished with wings, about two-thirds of the size of the elytra, unfolded, and with two diagonal nerves, and that the wings of the female are not above half the size of those of the male.

The legs of the male are rather longer and larger than those of the female. In both sexes the four posterior femora and tibiæ are compressed (especially the hinder pair), so that when seen sideways they appear much stronger and thicker than when seen from above. The anterior tarsi of the male have the first three joints dilated and thickly clothed beneath with short hairs; the third joint being produced obliquely and flatly on the inside. The tarsi of the female are quite simple. In the *Iconographie des Coléoptères d'Europe*, t. I. f. 2, the penultimate joint of the four posterior tarsi of *Ct. trinotatum* ♂ is represented bilobed. Klug's figure of *Ct. rugosum* (which is drawn from a female) represents

the penultimate joint of the anterior, as well as of one of the intermediate, and of one of the posterior, tarsi, as bilobed. This joint, however, in all the legs is simple in both sexes of *Ct. ichneumoneum*; and also, I imagine, in all the other species, else Dejean would doubtless have noticed it.

The elytra of the male are elongated and rounded at the tips, whilst those of the female are less elongated, and truncated so as nearly to form three slight teeth. This character therefore, in this species at least, is a sexual and not a specific one.

The penultimate segment of the abdomen of the male is emarginated beneath; the last segment in the females is long and pointed at the tip, and there are two lateral lobes above, united apparently on their inner surface.

With reference to the geographical distribution of insects, it may be mentioned that the genus *Ctenostoma* appears to represent in South America (of which all the species are natives) the Asiatic genus *Colliuris*.

I am happy in having come to the possession of the sexes of one of the species of this rare and interesting genus, and in being consequently enabled to illustrate it with the sexual characters given above, and to correct the specific characters of the same species given by Dejean.

Ct. ichneumoneum. Dej., Species General, &c. v. 2. Suppl. p. 436. ♀
 —————, Guérin, Iconogr. du Règne Animal, Insectes. pl. 3.
 fig. 3.

Ct. nigro-subæneum, nitidum, elytris punctatis basi subtransversim rugosis, maculâ mediâ transversâ apiceque flavis.

Long. Corp. ♂ et ♀, lin. $5\frac{1}{2}$.

Habitat in Brasiliâ. In Mus. Dejean, nostr. ♂ et ♀.

This is a very distinct species. The sexes are of equal size, and their general specific characters are precisely similar, except as before and after mentioned. The antennæ are brownish black, with the first three joints yellowish brown, their upper surface being black. The surface of the head is nearly flat in front, and punctured, especially between and behind the eyes, and has upon its surface several rugosities forming two longitudinal channels between the eyes, and terminating behind them in a semicircular transverse ridge, behind which the head is narrower, smooth, and shining. The colour of the head, trophi and thorax is shining black, slightly bronzed; the latter is highly polished and impunctate, and formed as in *Ct. trinotatum*, as described by Dejean; the elytra

are long, very narrow at the base, and increasing nearly to the tip. Dejean says of the elytra of his insect, "leur extrémité est échancrée et " n'est pas prolongée," evidently from an inspection of the female. The variation in the formation of the elytra of the sexes I have detailed above. They are of the same colour as the head, and covered with punctures, especially at the base, where these occasionally unite together and form a few transverse ridges. These have one transverse, pale yellow fascia behind the centre, slightly interrupted at the suture, and the apex is of a more obscure yellow colour; the slender margin of the elytra is pale brown. The legs are black bronzed, with the base of the four posterior femora pale yellowish brown. All the parts of the body have long delicate hairs scattered sparingly over them.

The sexes of this species now in my collection were the only two individuals contained in a large collection of Brazilian insects lately arrived in England. "Trouvée" according to Dejean "dans les environs " de Rio Janeiro, dans un bois très-touffu. Elle se tient sur les branches des " arbres et court avec beaucoup d'agilité." The species differs from *Ct. formicarium*, *Colliuris formicarium*, Fab., in having the apex of the elytra pale; and from *Ct. trinotatum* in wanting the pale spot at the base of the elytra. Its situation in the genus may be seen by the following

Synopsis Specierum.

1. *Ct. formicarium*, elytris maculâ mediâ transversâ flavâ.
2. *Ct. ichneumoncum*, elytris maculâ mediâ transversâ apiceque flavis.
3. *Ct. bifasciatum*, elytris posticè lævigatis, fasciâ anticâ mediâque transversâ flavis.*
4. *Ct. trinotatum*, elytris maculâ baseos, mediâque transversâ apiceque flavis.

* This new species of M. Dejean (*Icon. des Col. d'Eur.*, 2d Edit., Vol. I. p. 55, pl. 6, f. 5.) might, from the coloured figures, be regarded as the insect figured under the name of *C. formicarium* in the first edition of the *Coleoptères d'Europe* (there being, as I have observed below, some doubt as to the identity of that species and the insect described by the German and Russian entomologists under the name of *trinotatum*). As, however, Dejean himself gives this as a new species, without any reference to former figures and descriptions, it must doubtless be considered as distinct, and the above question still remains unsettled.

5. *Ct. rugosum*, elytris posticè lævigatis, maculâ baseos apiceque latè pallidis.

From Sturm's figure and Dejean's description of this last insect, it is evident that the central fascia and the apical spot are united. It may also be noticed that Klug's specific character of *Ct. trinotatum*, is not sufficiently explicit, as it will also apply to *Ct. ichneumoneum*. Dejean, however, has corrected it and indeed Klug's specific detailed description appears exact.

From the variation in the description of the markings of *Ct. trinotatum* in the different authors, I think it not improbable (if the descriptions and figures be faithful) that two distinct species are confounded; since, from Klug's description, and Fischer's figure, it appears that the *base* itself of the elytra is pale yellow, while Dejean's description and figure in the *Iconographie des Coléoptères*, t. 2, f. 1, represent the basal spot as a distinct fascia "*près de la base*." If my supposition, which is not an improbable one, be correct, Fischer and Klug's insect will retain the name of *trinotatum*, and it will be specifically characterized as above by its "*macula baseos*;" and it will be necessary to give a new name to the insect described and figured in the French works.

Description of the Figures, (all more or less magnified.)

TAB. SUPP. XLI.

Fig. 3. *Ctenostoma ichneumoneum*, Dej., ♂

- a. Labrum of the male.
- b. Ditto of the female.
- c. Apex of the elytra of the male.
- d. Ditto of the female.
- e. Underside of the terminal joints of the abdomen of the male.
- f. Ditto ditto of the female.
- g. Anterior tarsus of the male.
- h. Ditto of the female.
- i. Posterior part of the thorax and its appendages, and abdomen of the male, with one of the elytra opened to shew the size of the wing.
- k. Head of either sex, shewing the relative size of the palpi

ART. XIV. *Observations upon the Notoxidæ, a Family of Coleopterous Insects, with Characters of two new British Genera separated therein. By J. O. WESTWOOD, Esq., F.L.S., &c.*

Order. COLEOPTERA.

Fam. NOTOXIDÆ,* mihi.

(Heteromera, Div. Trachelides, Fam. Anthicites, Latr.)

IT has already been thought necessary to separate several insects from the extensive genus *Notoxus*, established by Geoffroy and Olivier, (*Anthicus*, Payk., Fabr., Gyll, &c., *Cucullus*, Latr., Règne Animal), and accordingly the name of *Anthicus* has been generically restricted to those species which in form resemble the true *Notoxi* (*Not. Monoceros*, &c.) but do not possess the cornuted thorax of those species. *Anthicus populneus* (figured by Panzer) has been formed into the genus *Xylophilus*, and Latreille (Fam. Nat. 383.) observes that it has the appearance of the *Bruchidæ*, having the posterior thighs incrassated, the second joint of the antennæ small, the third long and thickened at the tip, and the remainder shorter than the preceding, and thick. In the Règne Animal another genus, *Steropes*,† is established in the family, in which the antennæ terminate in three very long joints. In addition to these I have thought it expedient to propose the two others characterized below, founded upon species varying very considerably in form and characters from the other groups.

Genus. ADERUS,‡ mihi, G. N.

Char. Gen. *Corpus* subovatum.

Caput transversum, inflexum, thorace latius, posticè in collum non productum, *oculis* magnis prominulis lateralibus.

* My reasons for forming the family name from *Notoxus*, are stated in the fourth volume of this work, p. 4.

† Had Latreille forgotten that at p. 240 there is also a genus *Sterope*?

‡ From α , privativum, $\Delta\epsilon\rho\eta$, collum; in consequence of the head not being produced behind into a neck.

Antennæ corpore dimidio breviores, articulo 1mo. magno, 2do.

3oque minoribus, 4to. et reliquis magnitudine et longitudine articuli primi, ultimo acuto.

Palpi maxillares articulo ultimo magno securiformi (maiores quam in *Anthico*.)

Palpi labiales clavati.

Thorax ferè quadratus subdepressus.

Scutellum minutum rotundatum.

Elytra elongata, posticè dilatata, subdepressa, thorace latiora.

Femora et *tibiæ* simplices.

Tarsi articulo penultimo bilobato.

The type of the present genus, which was described by Marsham as a *Lytta*, and which is the only species in the genus, departs considerably from the appearance of the *Anthici*, especially in the shape of the head and thorax and the simple thighs, although its principal characters will bring it near those insects. The smallness of the second and third joints of the antennæ appears to be a striking character.

Sp. un. *Boleti*. Ad. testaceo-ferrugineus, subtilissimè punctulatissimus tenuissimè sericeo-pubescent, capite obscuriori, oculis nigris, abdomine fusco, elytris in quibusdam partibus quasi frictione denudatis, thorace posticè transversim impresso.

TAB. SUPP. XLI. fig. 4. ♀ ?

Syn. *Lytta Boleti*, Marsham, *Ent. Brit.* p. 486.

Aderus Boleti, Steph., *Catal.*

Habitat in foliis Quercûs. Captus, Septembre ineunti, 1826, prope Ensham, Oxoniæ.

In Mus. Curtis, Kirby, Stephens, nostr.

Long Corp. lin. $1\frac{1}{4}$.

This species is undoubtedly the *Lytta Boleti* of Marsham: my friend Mr. Stephens having allowed me to compare it with the identical specimen described by that author, with which it perfectly agrees. This examination enables me to correct his description of the colour of the head, which he states to be black. The head of the insect is, however, dark ferruginous brown, with large black eyes. It does not appear to be noticed by the continental writers, since Marsham's reference to the *Notoxus*

calycinus of Panzer is decidedly incorrect, that species being (according to Schönherr, and confirmed by Panzer's figure) merely a variety of *Anthicus floralis*, which is a true *Anthicus*, and congeneric with *Anth. antherinus*, which I take to be the type of that group. The *Aderus Boleti* may perhaps be the *Notoxus melanocephalus* of Panzer,* notwithstanding Gyllenhal gives that insect as the female of *Anthicus (Euglenes mihi) pygmæus* as after mentioned, considering also the *Anthicus ferrugineus* of Paykull to be synonymous with the *Not. melanocephalus*. It is certainly not the *Anthicus (Xylophilus) populneus* (with which it agrees in colour), that species differing essentially from the *Aderus Boleti* in its generic characters, especially in those of the antennæ and hind legs.

Marsham says of his *Lytta Boleti*, "Habitat in Boleto velutino. Larva et Imago simul semper adsunt."

I beat two specimens of this interesting insect in the month of September, 1826, from the oak near Ensham, in Oxfordshire; they ran about quickly, although not with the vivacity of the *Anthici*, having, indeed, somewhat the appearance of an *Anobium*. Mr. Stephens has since met with several specimens at Ripley, all agreeing in colour and general appearance, although I noticed that the legs and antennæ of one of the smallest specimens were longer than in the others; the basal joints of the latter organs were however similarly shaped, and I think it therefore not improbable that this might be the male, and the others females.

Genus. *EUGLENES*,† *mihi*, G. N.

Char. Gen. *Corpus* elongatum subdepressum.

Caput magnum, transversum, deflexum, thorace latius, *oculis* masculis maximis in fronte fere conniventibus, profundè punctatis; femineis mediocribus lateralibus.

Antennæ subtus oculos insertæ; masculæ fere longitudine corporis, filiformes, subtus seu intus subserratæ, articulo

* This is very doubtful, since, I think, that if it were the case, Gyllenhal would not have omitted all notice of the peculiar formation of the basal joints of the antennæ in his description of that insect, and which he states to agree with the female of *oculatus*.

† From Εὔ, bene, and γλῆνῃ, pupilla, oculus; from the singularly large eyes in the males.

1mo. crasso, 2do. brevi, ultimo elongato subcylindrico, apice obliquè truncato; femineæ crassiusculæ vix dimidio corporis longioribus, ad apicem crassioribus, articulis 1mo. et 2do. crassis, ultimo magno cylindrico.

Palpi articulo ultimo dilatato subsecuriformi.

Thorax brevis fere quadratus, posticè paullo latior.

Elytra thorace latiora, depressa, elongata (præsertim mascula.)

Pedes simplices longiusculi, femoribus posticis (præsertim fæmineis) paullo crassioribus.

Tarsi articulo penultimo bilobato.

The above characters are drawn from insects receding still farther from the true type of this family than the *Aderus*, more especially in the singular structure of the eyes and antennæ which vary in the sexes; in fact, the peculiar formation of the latter organs gives the males of these insects, when magnified, somewhat the appearance of *Calopus serraticornis*, between which and *Euglenes*, it is, indeed, probable that a nearer than analogical resemblance may exist.

Gyllenhal gives the two following species, (which from the similarity in formation are referable to the same subgenus,) although it may perhaps be doubted whether, as that author has indeed surmised, they may not eventually prove identical.

Species 1. *Cerambyx pygmæus*, De Geer, (*Anthicus pygmæus*, Gyllenhal); the female of which, according to the latter author, is the *Notoxus melanocephalus* of Panzer.

Species 2. *Anthicus oculatus*, Paykull, the female of which is without a doubt the *Lytta nigricollis* of Marsham, a name which must sink into a synonym, Paykull's name having the priority. Marsham's *Lytta nigricollis* was, I believe, unique as British in Mr. Kirby's cabinet until last July, when numerous specimens of both sexes were beaten out of a whitethorn bush at Windsor, by Messrs. Griesbach and Waterhouse; thereby confirming the correctness of Gyllenhal's views as to the identity of the sexes, and also that the female is the *Lytta nigricollis* of Marsham; its specific character, which is applicable to both sexes, is

Euglenes oculatus, Eugl. niger punctatissimus, tenuiter pubescens, antennis pedibus elytrisq. testaceo-fuscis, his interdum ad apicem obscurioribus; thorace posticè transversim impresso.

Long. Corp. ♂ lin. $1\frac{1}{3}$. ♀ lin. 1.

TAB. SUPP. XLI. fig. 5. ♂ fig. 6. ♀.

My specimen of the male is rather larger than the female.

Description of the Figures.

Fig. 4. *Aderus Boleti*, magnified.

a. The head, seen in front. a. Antenna magnified.

Fig. 5. *Euglenes oculatus*. ♂

a. Head seen in front to shew the size of the eyes, and insertion of the antennæ.

Fig. 6. *Idem*. ♀

a. Head seen in front, shewing the smaller eyes. a. Antennæ.

P. S. Latreille, in the new Edition of the Règne Animal, t. v, p. 73, has removed the genera *Rhaebus* and *Xylophilus* from the *Notoxidæ*, and has placed them immediately after *Bruchus*, with the observations, “ Les Rhébes (*Rhaebus*) de Fischer se distinguent des Bruches par leurs élytres flexibles, et les crochets bifides de leurs tarses.

“ Les Xylophiles (*Xylophilus*) de Bonelli s'en éloignent par leurs palpes terminés en massue.”

The *Anthici populneus*, *oculatus* and *pygmæus* of Gyllenhal are all stated (but incorrectly, vide supra) to be the types of the latter genus, which I cannot but think has much more affinity with *Anthicus* than with *Bruchus*.

ART. XV. Characters of the genus of Coleopterous Insects, *Amydetes* of Hoffmannsegg, belonging to the Family Lampyridæ, and Descriptions of two Species. By J. O. WESTWOOD, Esq., F.L.S., &c.

Order. COLEOPTERA.

Fam. LAMPYRIDÆ.

(Pentamera, Div. Serricornes, Fam. Sternoxi, Latr.)

Genus. AMYDETES, Hoff.

Char. Gen. *Corpus* elongatum, depressum.

Caput parvum, sub thorace omnino absconditum, oculis magnis lateralibus.

Antennæ longiores articulis 37, articulo 1mo. majori, 2do brevi, 3tio. et reliquis brevibus, singulo (in maribustantum?) ramulum elongatum apice compressum intus emittente.

Palpi breves articulo ultimo subsecuriformi.

Thorax semiorbicularis marginibus reflexis, angulis posticis acutis.

Scutellum mediocre posticè rotundatum.

Elytra lineari-elongata depressa mollia, (lineis 4 aut 5 elevatis fere obsoletis,) abdomine longiora.

Pedes breves inermes.

Tarsi articulo 4to minuto bilobato.

The establishment of genera which appear more closely to connect families already nearly allied, (although not of so great interest as the establishment of such as *Nycteribia*, *Stylops*, &c. connecting groups apparently more distant) cannot but be regarded with attention by the entomologist, as, tending to confirm the remark of Linnæus, that “Natura non facit saltus.”

The two insects, which I am about to describe, would, were the antennæ broken off, be placed with the elongated *Lampyrides*, such as *Lamp. noctiluca*, &c., to the general habit of which they very nearly approach. The antennæ, however, of such exotic *Lampyrides* as I have examined, are not above eleven jointed, and in each joint there is only one point from which the flabella arise; for, in those species, *Lamp. Latreilli*

Kirby, &c. the antennæ of which are biflabellate, the flabella on each side arise from the same part of the joint, and not (as in the dipterous genus *Ctenophora*) from various distances from the base of various joints. In the two species of my new genus, however, the antennæ have upwards of thirty-five joints, the first and second alone being without pectinations, thus pointing the way to the genus *Rhipicera*, one species of which, from New Holland, Mr. Kirby describes as having upwards of thirty pectinations in the antennæ. The genus has doubtless a near affinity with *Phengodes*, and was separated by Hoffmansegg from the *Lampyrides* in the same paper in which he established that group. The generic characters given by him were by no means sufficiently detailed, and I have therefore attempted to supply the deficiency. And indeed in regarding the following insects as belonging to this genus, it is proper to state, that Illiger describes the antennæ as having "mehr als vierzig Gliedern."

We may presume that the female when discovered will be found to possess simple antennæ.

The student will find some interesting observations upon the singular anomaly of certain insects possessing more or less than the usual number of joints in the antennæ, in Dalman's *Analecta Entomologica*, under the genus *Polytomus*, and also in Kirby and Spence, Vol. III. 321 and 519.

Sp. 1. *Apicalis*. Am. testaceus crebrè punctulatus subpubescens, elytrorum apice fusco.

Amydetes apicalis, Germar, *Insect Sp. nov.* p. 67.

TAB. SUPP. XII. fig. 1.

Long. Corp. lin. 4.

Habitat in Brasiliâ. In Mus. Dom. Haworth, nostr.

Descr. Caput fuscum, oculis nigris, ore fulvo. Antennæ articulis 1mo.

2doque flavis, reliquis fusco-testaceis. Thorax flavo-testaceus disco elevato obscuriori. Scutellum testaceum. Elytra tenuiter pubescentia, in utroque lineis 4 elevatis longitudinalibus, fere obsoletis.

Corpus subtus fuscum; abdomen segmentis ultimis lætè flavis.

Pedes dilutè fuscescentes.

The only two specimens which I have yet seen of this insect are males, one is in Mr. Haworth's cabinet, and the other in my own. I had originally named the insect in my MSS. after that gentleman as a slight return for the many entomological favours which I have received from him, and through whose kindness my own collection has been enriched

with this interesting insect; but I find it has since been described by Germar.

Species 2. *Vigorsii*. Am. fuscus crebrè punctulatus pubescens, thoracis elytrorumque marginibus testaceis.

TAB. SUPP. XLI. fig. 2.

Long. Corp. lin. 6.

Habitat in America meridionali. Peru. Humboldt.

In Mus. Dom. Vigors.

Desc. Caput fuscum oculis magnis nigris, antennæ pedesque fuscescentes.

Thorax fuscus marginibus testaceis. Scutellum testaceum. Elytra pubescentia, lineis 4 ut in priori, fusca marginibus suturâque testaceis.

Corpus subtile ut in priori.

This insect is considerably larger than *Am. apicalis*, and is differently coloured. I am informed that it was brought from Peru by the celebrated Humboldt; it is now in the Cabinet of Mr. Vigors, who has kindly allowed me to give it as an accompaniment to my own species. Mr. Vigors also possesses a specimen brought from Brazil by Wm. Swainson, Esq.

It appears to me that this species differs materially from the *Lampyris plumicornis*, Latr., (Humb. Voy. 1, 156, pl. xvi. f. 4,) not only in the more obscure colouring of the latter species, but also in its habitat, Latreille's specimen having been taken by Humboldt near Valladolid, in Mexico.

Description of the Figures.

Fig. 1. *Amydetes apicalis*, magn.

2. *Amydetes Vigorsii*, magn.

A. Head seen in front.

a. One of the flabella of the antennæ seen sideways.

b. Maxillary palpus.

B. Anterior tarsus.

ART. XVI. *Descriptions of several Oriental Lepidopterous Insects.* By THOMAS HORSFIELD, M.D., F.R. and L.S., &c.

Genus *ACONTHEA*, Horsf. Descr. Cat. of the Lepidopterous Insects in the Museum of the East India Company. Part II.

PAPILIONIS species, Linn. PAPHIÆ species, Fabr.

NYMPHALIS species, Latr.

Character of the Genus.

Larva chilopodomorphous, linear, lengthened, provided on each side with ten long, attenuated, spreading, brachiform appendages of nearly equal length, consisting of a mid-rib and lateral beards, decreasing in length towards the extremity, and imitating the structure of a very delicate plume, being armed with a terminal spike, composed of dense whorls of short robust spines. Feet agreeing in number with those of the other larvæ of this tribe; short minute and entirely concealed by the lateral appendages.

Chrysalis short, angular, attenuated at both ends, with two sides even, and the third gently swelled and rounded; consisting of two unequal pyramidal portions, the terminal being longest, and provided with two points, while the angles are armed with a few short spines, which are more robust at the union of the two pyramids: the longitudinal and transverse ridges ornamented with a delicate golden streak.

Perfect Insect: *Antennæ* of very great length, slender, filiform at the base, beyond the middle very gradually incrassated to a long cylindrical abruptly terminated, slightly curved capitulum.

Palpi of moderate length, slightly projecting beyond the head; second joint greatly lengthened and increasing in breadth exteriorly; third joint minute.

Proboscis of moderate length, robust, compressed towards the extremity and provided with delicate lateral, spreading ciliæ.

Wings: anterior pair somewhat triangular, with a lengthened boldly curved costal and somewhat excavated posterior margin; hinder pair rounded, very slightly attenuated, obtuse, repand or slightly notched.

Feet: anterior with tarsi differently constructed in the sexes; in the *male* consisting of a single elongated, attenuated joint, covered with a dense uniform down; in the *female* with five joints of equal dimensions as to breadth, but diversified in length, the first greatly lengthened, the three remaining short, the last abruptly terminated, with several spines along the edge of the three extreme joints.

OBSERVATION. The detailed description of this genus being reserved for the third part of my Catalogue of the Lepidopterous Insects contained in the Museum of the East India Company, I have in this place merely enumerated the essential peculiarities. The larva and chrysalis of *Aconthea primaria*, one of the typical species, are figured on the eighth plate in the second part of the same work, where also the antennæ; palpi, proboscis and feet are represented in detail; and in referring the reader to the illustrations which I have given of the larva and chrysalis of this very singular genus, it is very satisfactory to me to be enabled to state, that it has also been observed by General Hardwicke on the Continent of India. This accurate observer has confirmed the details I have given, in all points; and he has, with his accustomed liberality, communicated to me his drawings. These exhibit the larva in three different points of view; that of the under side is particularly interesting, as it supplies a deficiency in my own series. The feet, although very minute, are distinctly exhibited; they agree in number and disposition with all other diurnal Lepidoptera. The pupa likewise, figured by General Hardwicke, resembles in every peculiarity that which I observed in Java.

In the second part of the work above cited, two species of *ACONTHEA* are figured on plate v.; the *Aconthea Lubentina*, being the *Papilio Lubentina* of Cramer, and a new species from Java, named *Aconthea Alankara*. My immediate object in this communication, is, to add the description of a new species, the *Aconthea Apaturina*, which, though not part of my collection, is, as far as has been ascertained, an oriental species, departing slightly from the typical form; and to illustrate an obscure species, the *Aconth. cocytina* indicated indeed by Fabricius, but not sufficiently discriminated from its neighbours in the series.

The metamorphosis of *ACONTHEA* is very remarkable, and strikingly illustrates the analogy which exists between the forms of the individuals of the class of Ametabola, and the larvæ of diurnal Lepidoptera. The

nearest representative of our genus, among the Ametabola, with which I am acquainted is *Scutigera*. This annulose animal, although disposed in the Chilopodomorphous, is close to its union with the Thysanuriform stirps: and *Aconthea*, in the series of Lepidoptera, follows immediately after *Biblis* and *Limenitis*, leading gradually to *Apatura*. These statements, which will be more fully illustrated in another place, accord with the arrangement of the series given in the Synoptic table of the stirps of the first tribe of the Lepidoptera See Horsf. Descr. Cat. &c. 61.

ACONTHEA COCYTINA.

TAB. IV, fig. 3, 3, a.

Alæ supra nigricanti-fuscae nitore obsoleto æneo lavatæ, areâ costali pallidiore lituris transversis dimidiatis variegatâ; anticæ fasciâ marginali latâ ad apicem sensim attenuatâ, posticæ dimidio apicali omni cærulescenti-griseis argenteo pulverulentis strigâ extimâ atrâ niveo fimbriatâ cinctis: subtis dilutè corticinæ limbis saturatoribus ochraceis; anticæ in regione anali basin versus striolis quinque atris interioribus brevioribus rectis exterioribus flexuosis. (Exp. alar. unc. $2\frac{1}{4}$.)

Papilio N. Cocyta. Fab., Ent. Syst. em. tom. 3. pars. 1. p. 127. No. 388.

Nymphalis? Cocyta. MM. Latr. et Godt., Enc. Méth. Hist. Nat. IX. 382.

In selecting this insect for the present memoir, my principal object has been to contribute, as far as I am able, to the illustration of a doubtful Fabrician species. A few explanatory remarks are therefore required. The first indication of our insect is in the Mantissa Insectorum, vol. 2, p. 29. After describing a lepidopterous insect found in Siam, from the Banksian Museum, with the name of *Cocytus* among the *Papiliones Danai festivi*, Fabricius adds the following note: "Simillimum ex India Orientali misit Dom. Lund: at alis dentatis margineque alarum postico cœrulescente, vix tamen distinctum." In the Entomologia Syst. emend. &c. vol. 3, p. 127, we find an insect from the Museum of M. Lund, agreeing with the individual concisely indicated in the note of the Mantissa; but it is there raised to the rank of a species arranged among the Nymphales, and

referred to Jones's drawings with the name of *Papilio Cocytus*: the very concise specific character has nothing but the following remark for its illustration: "affinis certe *P. Bella* at differt alis haud falcatis, ecaudatis et dentatis." Now it appears from the preceding details that our insect should have rather been compared with *P. Cocytus*, with which it was originally associated. This oversight of Fabricius has called forth a very severe censure from the authors of the *Encyclopédie*.

The description of the *P. Nymphalis Cocytus* of Fabricius, which is now offered with the name of *Aconthea Cocytina*, has been made from individuals brought by Sir Stamford Raffles from Sumatra. The name has been modified in order to prevent a collision with the insect discovered in Siam, to which the name *Cocytus* was applied among the *Danai festivi*. The Banksian cabinet of insects, so frequently cited by Fabricius, and now deposited in the Museum of the Linnean Society, still contains the individual from which the description of the *P. Cocytus* appears to have been made. The specimen, although in an indifferent state of preservation, exhibits the peculiarities of this species, the most prominent of which are the falcate wings, and the posterior brown band on the under surface of the fore wings: but my object is not at present to illustrate the *Papilio Cocytus* of Fabricius; I trust however, that the preceding details, with the figure accompanying them, will procure a place for the *Aconthea Cocytina* in the systematic catalogues.

ACONTHEA APATURINA.

TAB. IV, fig. 1; 1, a.

Alæ suprâ nigræ, anticæ serie duplici marginali arcuque costali punctorum alborum, lunulis insuper duabus anguli apicalis interioris punctoque solitario ad medium costæ sito cærulescentibus; posticæ fasciâ lutâ saturatè azureâ versus angulum analem anteriorem attenuatâ, strigisque duabus macularibus margini postico parallelis, alterâ exteriori ex striolis albis alterâ interiori ex maculis oblongis atris conflatâ: subtis fuscæ, anticæ notis marginalibus paginæ superioris signatæ, fasciisque insuper duabus parallelis abbreviatis in area mediana dispositis; posticæ strigâ regulari nived limbatæ, maculisque atris paginæ superioris inscriptæ anali didymâ reliquis

oblongis; serie insuper interiore punctorum minutorum, arcu denique obsoleto discoidali fusco cano adnato. (Exp. alar. unc. $2\frac{1}{2}$.)

The native place of this species, is, as far as I have ascertained, the Island of Java, but it does not form part of my own collection. The peculiarities of our insect, as far as regards habit and outline, are indicated by the name: according to my views, it stands in the series near the confines of the genus *Apatura*. The antennæ agree in form with *Aconthea*, but they are slightly abbreviated. The external character is likewise intermediate; the colouring imitates that of *Apatura Lasinassa*, while the abbreviated transverse bands are more peculiarly a characteristic of the individuals of *Aconthea*. I have endeavoured, in the description, to represent every essential particular of its markings.

PONTIA THYRIA.

TAB. IV, fig. 2.

Alæ integerrimæ subconcolores dilutè rubræ, nervis fuscis: anticæ elongato-trigonæ; posticæ rotundatæ. (Exp. alar. 2 unc. 7.)

Pieris Thyria, MM. Latr. et Godt., Enc. Méth. Hist. Nat. IX. p. 147.

With the preceding concise character this species is noticed for the first time in the Encyclopédie. Its native place is the Island of Java. Three specimens have come under my observation; two of these, a male and a female, form part of the Museum at the India House; a third was presented to my private collection, by Mr. G. B. Sowerby. In the prosecution of my Descriptive Catalogue it will be disposed in a separate section, with several other Javanese and Asiatic species. The anterior wings in the individuals of this section are elongate-triangular, somewhat acuminate, with an uniform posterior margin, giving a decided obliquity to the wing.

The male, in our insect, is distinguished by a more rich and saturated colour above, by very prominent blackish nervures, and by a very faint posterior border. In the female, both wings have a distinct broad blackish posterior border, and the anterior pair has besides a band of the same colour near the outer apical angle, passing obliquely from the middle of the costa towards the margin, being succeeded by several indistinct arcs.

The tint in the female is less brilliant. Underneath, both pairs have a saturated sulphureous-orange colour, which assumes an obscure vermilion tint in the medial and basal areas of the forewings. In the female, the surface is variegated by the transmission of the marks of the upper side, and by grayish irrorations towards the margins. The thorax in both sexes is clothed above with a greenish, and underneath with a yellowish down: the body is blackish above, and gray underneath.

ART. XVII. *Observations on the Fringilla Canaria, Sylvia Atricapilla, and other Birds of Madeira.* By C. HEINEKEN, M.D., &c.

HAPPENING to meet with "Starke's Elements of Natural History" a short time ago, I observed that his specific character of the *Fringilla Canaria* was, word for word, the erroneous* one of the 12th Edition of Linnæus's *Systema Naturæ*; and, as I suppose, from Mr. Starke's work being very recent, and professedly a compilation, that the best authorities are had recourse to, I conclude that a more accurate description is not to be met with, and therefore offer the following:—

Fringilla, (Illig.) Sect. 1. *Laticones*, (Temm.)

Fring. Canaria,
Fring. butyracea, (Linn.) }

Adult male.—*Irides* dark brown. Upper mandible fuscous, sides and tip darker; lower livid flesh-colour. Legs brownish flesh-colour. Front, brows, line below the eyes, chin, throat, (extending backwards and forming an indistinct, imperfect collar with the slight shade on the *nucha*,) breast, rump, and lesser wing-coverts greenish-yellow: scapulars, and larger coverts deeply shaded with the same: *nucha* and back (a tinge

* I say "erroneous," because never having heard a doubt about our bird being the true *Fring. Canaria*, I assume that it is so, and consequently that "F. rostro corporeque albo-flavicante, rectricibus remigibusque virescentibus, rostro albido," (Linn. 12th Ed. Vol. I. p. 321.) can only apply to one of its numerous varieties.

only on the latter) similarly, but very slightly shaded. *Abdomen*, as far as the legs, golden-yellow : vent, under tail-coverts, thighs, and sides, dirty white, the latter with large longitudinal brown spots. *Vertex*, *occiput*, cheeks, back, larger wing-coverts, scapulars, and upper tail-coverts brown-ash, with a longitudinal brown spot down each feather ; indistinct, small, and light-coloured on the head, &c., large, dark, and defined on the other parts. *Remiges*, *tertiaries*, and tail-feathers brown-black, with pale brown-ash edges : the external margin of the first four or five *remiges* white, of the rest pale greenish-yellow. Length $5\frac{1}{4}$, breadth 9 inches. Bill about 4 lines. Weight about $\frac{1}{2}$ oz. Tail (which is forked) 2 inches 4 lines. *Tarsus* about 8 lines.

Adult female.—General plumage more dingy and indistinct ; rump only greenish-yellow, with a tinge of the same round the eyes, and on the throat, breast, and wing-coverts.

Variety ♂ (♀ ?) General plumage more grey ; colouring more inclining to green : somewhat larger ; song the same. Its produce with the tame bird stronger.

Young male.—Like the female, but with the legs brown-black, and the lower mandible darker.

Young female.—No yellowish or greenish colouring.

Habitat. Universal.* It builds in thick bushy high shrubs and trees, with roots, moss, feathers, hair, &c. ; pairs in February ; lays from 4 to 6 pale blue eggs, and hatches five times (not unfrequently six) in a season. It is very familiar, haunting and breeding in gardens about the city. It is a delightful songster, with, beyond doubt, much of the nightingale's and sky-lark's, but none of the wood-lark's song, although three or four sky-larks in confinement in Funchal are the only examples of any of these three birds in the island, and notwithstanding the general opinion, that such notes are the result of education in the Canary : it is in full song about nine months in the year. I have heard one sing on the wing and passing from one tree to another at some distance, and am told

* Wherever this is stated, I wish it to be understood as applying to the south side of the island only, although in most instances (I believe in this) it might be extended to the north. Of the latter, in consequence of ill health, I know little or nothing from personal observation.

that during the pairing season this is very common. Each flock has its own song, and from individuals in the same garden differing considerably, I suspect that of each nest varies more or less. After the breeding season they flock along with linnets, goldfinches, &c. and are then seldom seen in gardens. The moult takes place in August and September. An old bird caught and put into a cage will sometimes sing almost immediately, but seldom lives longer than the second year in confinement. The young from the nest are difficult to rear, dying generally at the first moult. They cross readily with the domesticated variety, and the progeny are larger, stronger, better breeders, and, to my taste, better songsters also than the latter; but a pure wild song from an island Canary at liberty, in full throat, and in a part of the country so distant from the haunts of men that it is quite unsophisticated, is unequalled, in its kind, by any thing I have ever heard in the way of bird-music.

In the 12th Edition of Linnæus (Holmiæ, 1766.) Vol. I. p. 321, I find, "*Fringilla butyracea*."

F. virens, superciliis pectore abdomineque flavis, remigibus primoribus margine exteriore albis.—*Chloris indica*, Edw. av. 84, t. 84. Briss. av. 3, p. 195.

Habitat in Madera.

Similis *Loxiæ butyracæ*, sed rostrum minus,"

and as it appears to me to be clearly the same bird, although I acknowledge that I should not by choice call ours "*virens*," I have adopted it as a synonym, to the exclusion of his *Fring. Canaria*, and its numerous progeny, which must be spurious if ours be true. The reasons for venturing on such a liberty are, that "*virens*" is not less applicable to it, than "*grisea*" at the next page is to *Fring. Petronia*, or "*testacea*" a little further forwards to *Motacilla Atricapilla*; that in other respects his description answers precisely; that he gives "*Madera*" as its sole and decided habitat; that we have no other bird either at all approaching to green,* or answering in the most distant manner to his description; and

* The *Fring. Chloris* is only blown to us occasionally and accidentally, and then only by twos and threes, and is never known to remain or build on the island. Two which a friend tried to rear died, and in the course of several years I have met with only one specimen. Were I to enumerate all the birds common in Europe which are seen but seldom, if ever, here, a tolerably long

that his having made a distinct species of it is so readily accounted for, by his having no doubt about the legitimacy of its representative. If "those of authority" in such matters admit that I have established my point, it follows that the Linnæan *Fring. Canaria* must be expunged, and the *Fring. butyracea* substituted for it. If they do not, I shall only mutter for my inward satisfaction, "bastards and else," over their Catalogue, and rest perfectly satisfied with having at all events unmade a *Fring. Canaria* by converting it into a *Fring. butyracea*; for the identity of the two species, call them by what name you will, is quite beyond all cavil. That the error has existed so long is owing partly to the injudicious preference too frequently given to bulky, faithless "translations," "compilations," and "improvements," forsooth! over original works. Gmelin's 13th Edition of Linnæus, as it is called, I have had the good fortune never to be burdened with, but in an evil hour a kind friend bestowed upon me the seven ponderous tomes of that kindred spirit, Turton. In this work, Vol. I, p. 559, the *habitat* is altered from "*Madeira*" to "*India*," and it is added, "Bill and legs brown, $4\frac{1}{3}$ inches long, sings finely." All this is done without one word in explanation. An act of forgery* on an illustrious name, is, in fact,

list might be made; the following, however, almost as extensively spread as man himself, are unknown to us:--the Raven, Crow, Cuckoo, Daw, Magpie, Sparrow (both house and hedge), Pheasant, Thrush, Sky-lark, and Nightingale. There are several others which do not occur to me at the moment.

* Whoever translates or revises an original work, and does not honestly point out every deviation from the text; and whatever compiler introduces, or alters, a word in a sentence marked as a quotation; is guilty of a literary fraud. In the last Number (XVI.) of the Zoological Journal, Mr. Bennett has restored a Linnæan species (*Mus Barbarus*), which either Gmelin's conceit or his instinctive propensity towards the erroneous (an obliquity by no means unusual with this sort of gentry) had for years excluded.

The first time I opened Mr. Starke's work, was at the *Anobium pertinax*, which he gives as Latreille's, putting at the end of the description (which is between inverted commas) "Lat. Gen. 1, 276." Now the "Genera" (Ed. 1806.) does not contain a description of the *Anob. pertinax*: neither, to prevent all subterfuge, is it a correct quotation of any description of any *Anobium*, in any of Latreille's works. In birds too, (these occurred accidentally, for I have not examined half a dozen in the two volumes,) that of the *Anthus rufescens*,

committed, and one of deliberate deceit on the reader. Whether Gmelin has lent his aid in this instance I am ignorant: it is most probable that he has: I trust that the sin rests with him and not with one whose original works of late have gone far to secure him from the obloquy which would attach to a mere compiler.* The synonyms given by Linnæus have,

although professing by the usual signs to be a quotation from Temminck, is not only abridged, but garbled as far as it goes. It is really high time that such things were put a stop to, and the remedy is one of easy and universal application. Only let societies, bodies, and individuals of weight in science, make and abide by a determination to quote and admit as authorities, original works alone, or well-established faithful translations, and our grocers and cheesemongers will soon know as much of "Natural History" as many of its would-be expounders. Pretenders are a pest in every thing: in science a curse secondary only to the food which nourishes them in the shape of "Catechisms," "Pocket-books," "Conversations," and, when a great name is to be shewn up, "a butterfly on a wheel," for their edification, volumes of nameless bulk. I have objected to the alteration of a "single word," and I do so because such an alteration in one of Latreille's descriptions, that of the *Calosoma sericeum*, for example, would convert it (there are other differences, but not in the identical description to which I refer) into the *Cal. Maderæ*: the one abundant, the other, as far as I know, never found here. I would even go so far as a letter, and however much it may remind the reader of "In the name of the prophet 'figs!'" when he sees "*Elophilus Lat.*, *Helophilus Leach*," in all the circumstance of generic pomp in "*Samouelle's Useful Compendium*," yet if the one has thought it worth his while to make so insignificant an addition as an aspirate, a mere "windy suspiration of forced breath," establishing what may be called, without offence I hope, "*Leach's genus H.*", the other was quite right in marking the distinction. Fabricius has called a butterfly, peculiar to this island I believe, *Xiphia*: were my classical sensitiveness so far to get the better of my common sense, as to induce me to add an *s* to it, I might be pitied; but if I then quote it as his, I state the thing which is not, and deserve blame: besides, too, as "to write and read comes by nature," according to honest Dogberry, it is but a pitiful thing, after all, to make a display of a natural gift at another's expence.

* Dr. Heineken is right in his conjecture. Gmelin is answerable for this deviation from the original authority, and Dr. Turton, who placed too implicit a reliance on one who did not deserve it, has here translated faithfully the so called thirteenth edition of the *Systema Naturæ*, omitting only the Cape of Good Hope as an additional habitat of the *Fringilla butyracea*.—Ed.

I suspect, also had their influence in obscuring the species, and if it were not too adventurous, I would almost doubt, either their accuracy, or that of the *habitat* given by Edwards and Brisson ; for it is highly improbable that the Canary should have existed so long as a native of India without being recognized. Of course, any person having access to the identical birds figured or described by these writers, or possessing a specimen of the *Chloris indica*, actually found in India, can easily set this question at rest : it being clearly understood that I only pretend to identify our bird with Linnaeus's *description*, declining all responsibility respecting either the individual from which it was taken, or the synonyms to which it is referred ; and that nothing short of a direct comparison between his specimen and my description, will satisfy me of their being distinct species.

We have a male variety of the *Sylvia atricapilla*, Lath. (Black-cap : Tinto negro*) which I have never met with before, or seen described. It is called "*Tinto negro de capello*" (Black-cap, with a hood or cowl), is a somewhat larger, and coarser bird than the common one ; its general plumage more sombre and olivaceous ; and the black, instead of being confined to the head, extends as low as the shoulders behind, and loses itself gradually on the breast before (see Fig. 2). In habit, æconomy, and song, it is precisely similar. Satisfied with the universal opinion, that it was merely a variety, I took no trouble to prove the fact, but as a friend visiting here last winter seemed much inclined to doubt it, I have taken some pains to investigate the matter, and the following are the results.

It is rare, for although the ordinary one is as common in our gardens (even in the midst of the town) as the hedge-sparrow in those of Eng-

* Bowdich, under the name of "*Intinegro*," ("*Tontinegra*," from "*Tontiço*," occiput, and "*negro*" black, is the original name,) calls this (our common one, not the variety) "*a new species of nightingale*;" but whoever reads his description will perceive that he is describing, as far as he goes, the *Mot.* and *Sylv. Atricapilla* of authors. To set the matter at rest, however, without waste of words, my sketch (1) of our common ♂ *T. negro*, is copied from Bewick's figure of that found in England. It is by no means one of his happiest efforts, but will answer the purpose of identifying the two birds.

land, I have never seen above a dozen either at large or in confinement. I have never seen or heard of a female example, and it is universally asserted that such never occurs. A friend who keeps and pays a good deal of attention to birds, once saw a Capello cock and common hen tending the same nest, but as he had no object in doing so at the time, he did not take the trouble of ascertaining the contents of the nest, or of pursuing the matter further. Two years ago I had a bird of this variety, which I have since ascertained was bought by the person from whom I obtained it of a country boy, in the nest, along with a common cock: nothing was known of the parents, or the rest of the young, if there were any. A short time back, hearing that a neighbour had one, I sent for it to look at; he being aware that I had no intention of becoming a purchaser, and indeed having no desire to dispose of the bird, being also rather too knowing in such matters to be easily deceived, may, I think, be thoroughly depended upon. He states that last year (1828), a *common* cock and hen Tinto negro built a nest in his garden; that four young ones were hatched, one of which died so young that nothing could be ascertained, another proved a common hen, a third a common cock, and this of the *Capello* variety. I do not hesitate, therefore, to give it as a variety peculiar to the male.

This is the only warbler worth noticing for its song which we have, and it amply makes amends for the absence of most of the others. I suspect that in this genial climate it is much superior to any of its own species in a northerly latitude, and inferior only to the Nightingale; and if "the wild sweetness of its note" used to bring to the placid mind of the enviable old naturalist of Selbourne, lines which he has almost improved by slightly mis-quoting, how often has it not *here*

" ————— spoke

" Of a dear quiet home afar,"

to those whose only home has been the grave. Humboldt mentions in his "Personal Narrative," a bird at Teneriffe, called "Capirôte," stating that he "had never seen it sufficiently near to know to what family "it belongs," and adding (from hearsay, of course) that "no effort has "been able to tame it," and that, "it is unknown in Europe." Now, from "Capirôte" in Portuguese (although probably a Spanish word also) meaning "a hood," and from the kind of impression which its

melody made upon the traveller, I have very little doubt about its identity with our Tinto negro, and consequently with the European Black-cap; for of course the assertion that he knew it not, even of a Humboldt, when following the confession that he "had never seen it near," is worth nothing. Here it is most easily tamed, and becomes more docile than any other cage-bird; but seldom attains to the melody which it pours out when at large, and is always unhealthy in confinement. The latter arises from the custom of feeding it (an insectivorous bird) entirely on fruit, and bread and milk; and it is for this matter o'fact reason, I fear, and not the more elevated one of "liberty being sacred to his soul!" ("Personal Narrative") that it dies at Teneriffe.

The Woodcock, (*Scolopax rusticola*, Linn.,) which is admitted by all not even to be a variety of the European species, is permanent, and breeds here; and had not the latter fact, like that of the variety of the Tinto negro, been occasionally called in question, I should have rested satisfied with its notoriety. Two years ago I saw a bird just fledged, which I was told had been taken from a Woodcock's nest. It answered to all the essential characters of the species, but as I never before saw so young a bird of any of the genus, and as the only reason given for the identity of the nest was simply "because it was so," the valeat quantum of this evidence will not, perhaps, amount to much, although it more than satisfied me. Woodcocks are brought about for sale as commonly in July as in December.* There is no sudden increase or decrease in their numbers. Forty years ago they were unknown here. One was then accidentally met with in the South, and afterwards abundance in the North of the island, where they were for many years plentiful, and since that time have never disappeared. But the best evidence is that of an old sportsman, who has in several instances found nests with three eggs (the

* There are no game laws. All descriptions of animals not domesticated are looked upon by the cultivators as "fruges consumere nati," and knocked on the head in all ways, and at all seasons, without ceremony: the wonder therefore is, not that we have so few, but that any should remain in such a purgatory. Nightingales were attempted to be introduced some thirty years ago, and heavenly they would have been in such a climate: it is said not to have suited them, but I shrewdly suspect they were all made into pies.

colour blueish, spotted with dark grey, size that of Pigeons'), and says that a boy once brought him one with five young ones, which he replaced in the nest, that they soon began to call, and that the old one immediately made her appearance ; that in shooting he has frequently raised the old bird, and heard the young ones among the brushwood call to her ; and that he believes they hatch twice, if not thrice, in the course of the season.

Whether the first visit of these birds to the island was accidental or voluntary, and whether their remaining stationary be from choice or necessity, it equally proves that migration is not the result of such a blind, brute instinct as some would have it to be ; for allowing in this instance both the first arrival and subsequent detention to be the result of necessity, the same cannot be the case with the Swift, which is equally a fixture, with its more than ample requisites for the most extensive transportation. The Swallow and Snipe are said to be periodical visitors, and the reason both for the stationary habits of the former bird, and the migratory of the latter two, is very readily to be found, I suspect, in one common cause, namely, *food*. The Woodcock finds its food about spring-heads, the margins of little mountain-rills, water-courses, &c. These are neither dried up here during our hottest summers, nor frozen in the severest winters. The Swift preys on insects universally, but throughout the summer on a moth which abounds so on our most parched and sterile sierras, that what with the insects and the birds the place seems all alive. The Snipe requires a tolerable quantity of poachy, moist, decomposing soil, for the production of its food, and this, even in the winter, is both scarce and very local, while at other times there is not a square yard in the whole island ; and the Swallow requires insects which are found only over streams, and something approaching to rivers, which we make but a sorry figure in at the wettest of seasons, and are entirely without six months in the twelve.

The Quail (*Perdix Coturnix*, Lath.,) is the identical European species. It is stationary and not polygamous ; it pairs like the Partridge ; lays from fourteen to sixteen eggs ; has three or four broods in the season ; and is found in bevies of a dozen or more, until the young are well

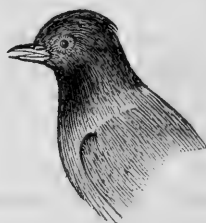
able to shift for themselves. A single pair will, in a favorable season, sometimes hatch above forty young ones.

Buffon says that the *Fringilla Petronia* “has no habit in common with the House-sparrow.” Here it completely supplies the place of the latter, builds under eaves, frequents corn and poultry-yards, keeps the whole place alive with its chirping, and is frequently met with in gardens in the city and towns, though seldom, if ever, seen in the public streets. It at the same time flocks and partially removes periodically, and numbers are always to be found living and breeding in trees, rocks, &c., far from all habitations.

Funchal, Madeira, 6th September, 1829.

Explanation of the Plate.

Fig. 1. Tinto negro————♂. 2. Tinto negro de Capello ♂.



ART. XVIII. *Remarks on some Animals sent from Jamaica.*
By E. N. BANCROFT, M.D., Corr. Mem. Z.S., &c.

TO THE EDITOR OF THE ZOOLOGICAL JOURNAL.

July 30th, 1829.

SIR,

I HAVE already written to you on the 27th inst., to acknowledge the receipt of your two letters, dated the 23d August last, and to acquaint you that the Jamaica Society had shipped on board the brig Mars, Hoseason, a small barrel containing the genital organs of a second Manta, (vide Zool. Journ. IV, 449.) alluded to in my letter of the 13th October, which I have since been led to suspect was a male, and not a female, as had then been supposed.* I was obliged to close my letter on Monday last, in very great haste, and omitted to inclose the drawings of the parts of that Manta; but I shall inclose them in this, with some sketches of my own, to be presently noticed. I now beg leave to acquaint you that I send you, for the Zoological Society, a chip box, a small flat oval keg, and a small phial, by the Barque Highbury, Capt. Pearce, and that these packages contain, inter alia, the following objects of Natural History, viz.

1. A species of *Procellaria* (not your *Thalassidroma*), which is per-

* In the letter here referred to, Dr. Bancroft states, "I had been led to suppose that the Manta we sent last year was a male, and the second a female, in consequence of the accounts given to me by some of our surgical practitioners here, who had taken the trouble of opening both subjects. I was, however, soon after led to doubt of their knowledge of comparative anatomy, and to suspect that they must have mistaken the sexes: otherwise there would be a singular deviation in the Mantas from the structure believed to be common throughout the Ray family, in which the males alone are furnished with a sub-cylindrical process from the side of each ventral fin next to the tail, a deviation that I consider as most improbable. But, to show that the error was not originally mine, and that I was led into it, I inclose two drawings of the parts in the second Manta, made by the gentlemen to whom I have alluded, in which is represented what they thought was the vagina."

haps new, as I find no description in the books we have here that agrees with its characters. I had drawn up an account of these to be read at one of our meetings here; but as I send you the original (in but sorry preservation, yet as I received it) I do not presume to transmit my paper to your Society, knowing how much better the subject will be treated and illustrated by your home naturalists.

2. It is accompanied in the box, by a specimen of *Scyllarus occidentalis*, Fab., which here and elsewhere is accounted rare, and may not be in your Society's collection. I am very sorry that this too is in an imperfect state. I originally rubbed it thoroughly with arsenical soap; and afterwards, in endeavouring to wash this off, and to diminish a part of its dirty or muddy look (which however is its natural appearance) I broke off one of its legs, and one of its *antennæ*. These I secured at the time, and they are sent along with it in the box. But I find that an ignorant careless servant has since broken off another leg (which is also sent), and done some other slight damage. I can therefore only say that I will endeavour to send you a more perfect specimen, both of this and of the *Procellaria*. In regard to the latter, I may state that, although not rare, it is with difficulty found, since it burrows only in crevices on the tops of our highest mountains, scarcely accessible. The individual now sent was hunted by a terrier dog from a hole on the summit of the Blue Mountain Peak, on the 17th of March last, and, as I am told, uttered the most piteous cries, like those of a child, while being dragged forth. These birds are found in some number on that spot, and individuals have sometimes gone thither to hunt them. They probably resort thither chiefly in their breeding season, and are very seldom seen flying except in the evening, when it is supposed that they proceed to sea. As they frequent this island, and have not been observed elsewhere, the species, if new, might be called *Proc. Jamaicensis*.

3. A species of Lamarck's genus *Loligo*, which is doubtless the *Sepia* mentioned with unpardonable looseness by Dr. Brown, in his Natural History of Jamaica, p. 386, so as to forbid all subsequent notice of it by naturalists. He says that it is "furnished with a great number of tentacles of different sizes and forms," and this he deemed sufficient! It differs in its form and in certain characters from all the species described in Lamarck's *Animaux sans vertèbres*, and other recent works, and seems

to be strictly a nondescript, except quoad Dom. Brown ut suprâ. Here it is called "Quib," and is seldom met with or eaten; but I learn that it is esteemed a great luxury at the Havaña, where they call it Calamar. It seems to me to be the more interesting as connecting *Loligo* with Lamarck's genus *Sepia*, having its "nageoire" nearly the whole length of the sac, as in *Sepia*, but not the opaque calcareous bone of the latter; being furnished with a delicate transparent cartilage in its stead, a sample of which is sent in the box. I kept it in brine for a good while, which has caused it to shrink, and has somewhat altered the shape and size of its fin. I therefore send you a memorandum I drew in pencil of its outward form, which is quite correct as to its dimensions, being drawn of the natural size. The salt, and the inky fluid of the animal together, have changed its greyish hue to a purplish one.

4. A species of Shark, which some of our fishermen call Nurse, and which is said to grow to the length of seven or eight feet. This is the only individual of the kind I have met with. Believing it to differ from every species I could find any description of, and considering it as the link between Cuvier's sub-genera *Carcharias* and *Scyllium*, I had made drawings of it, and a statement of its characters, also for our Society. But I gladly avail myself of the present opportunity of sending the specimen to your Zoological Society, as I indulge the hope that Mr. Bennett will be induced to bestow his attention on it, and do it a degree of justice which it could not receive from me, with means too so limited as to information. Were the title of *Squalus ocellatus* not pre-occupied, this might suit it: *Squal. Argus* may answer in its stead.

5. A small specimen of *Squalus Zygaena*, which I venture to send, because individuals of this size may not readily be found in European Musea; and because, if Mr. Bennett should have derived his knowledge of the species only from books or from dried specimens, he may perceive how very incorrectly its features have been represented, especially as to the shape of its head, which has been always represented at right angles with the body, and the situation of the eyes, always drawn as protruding greatly from the side of the lateral processes. It has, besides, been incorrectly described, e. g. by Gmelin (in Turton's edition of *Linnaeus*) and the writer of the article *Squalus*, in Rees's *Cyclopædia*, who have assigned to it temporal orifices, which it has not. I consider that a good

figure and an exact description of this fish are desiderata, which I hope now to see supplied in the Zoological Journal; and I trust that the liberty I take will be excused, when I suggest that, with a creature of this extraordinary formation, a front view, and a side view, would be very useful in order to convey a just idea of its peculiarities. In the Sharks, too, I consider that a representation of the under surface is not less instructive than in the Rays. I inclose a memorandum I took in pencil, of the form of the head, and position and appearance of the eyes, while the fish was quite fresh: it is of the natural size, and may assist in the drawing to be made.

6. A series of ovarian *sacculi*, connected by a membranous cord, that was found not long ago near one of the wharfs of this city. I have not yet been able to ascertain by what animal it was deposited. I had a similar specimen lately, but shorter and rather smaller, which I kept for several weeks in water, without its exhibiting the slightest tendency to putrefaction. During my short absence in May last, the *sacculi* separated at their edges, and the *ova* escaped, and appear afterwards to have become decomposed into particles so minute as to have eluded observation when the water was occasionally changed. To prevent a similar accident with the present specimen, I put it into rum.

7. The tail of a small specimen of *Raia Sloanii* (Cuvier) which I send, because it has its sting perfect, and this the fishermen are not easily prevailed on to allow to remain. This species is here called the "Sting-ray," and, when so small as the specimen to which this tail belonged, "Maid." I had the fish put into water to macerate previously to its being put into spirit; but the servant neglected it, and, notwithstanding his assertions of its not being putrid, when at last I ordered it to be brought to me, the body was quite gone. I will send you another specimen as soon as I can, and in the mean time I inclose an unfinished sketch I took (of the natural size), showing its form and features. Compare this with the figure of Sloane, pl. 246, f. 1, and you will see the excessive distortion represented in the latter, which I know not how to account for, except by supposing that it was drawn by a careless ignorant artist, from a dried specimen, in which all the softer parts had shrivelled up, and to which he thought it necessary to add all the monstrosity of feature in the head that his fancy could invent. In a paper in the box

you will find the curious membranaceous coverings of its upper and lower lip ; as I could detect nothing like teeth in the fish (notwithstanding the “ dents menues, serrées en quinconce ” assigned by Cuvier to his sub-genus Pastenague) I regard the hard granulations on them as its substitutes for teeth.

8. A fish (about nine inches long) called here Butter-fish, but not noticed by Brown, nor described by any Ichthyologist, so far as I can discover. It falls under Cuvier's sub-genus *Serranus* of the Percoid family. I wish it may preserve a portion of its colours, which, particularly over the head, *opercula*, and middle of the body, are of a full bright scarlet, changing into a rose-colour over the *abdomen*. Its contrast with the black dots, especially with those of them that are ocellated, give it a very handsome, almost splendid, appearance.

9. A specimen of Brown's Gar-fish (p. 443.), which both he and other naturalists have chosen to refer to *Esox Belone*, though it is different from that species. Its teeth are not black ; its back not black (but dark green) ; the inside of the mouth not purple ; belly not flat ; dorsal and anal fins very different in form from those represented in Shaw's and Bonnaterre's figures, and the caudal still more so. Eyes also not round, as to *iris* and pupils, as in these two figures, but ovate ; and there is a peculiarity in the form of the *iris*, which sends forth a rounded process covering a part of the upper circle of the pupil, as if this were emarginate. I consider this species therefore as almost a nondescript.

10. A small specimen of Brown's Piper, *Esox Brasiliensis*, in which, if it preserve its characters through the voyage, you will perceive two marked features, unnoticed by Brown, first, in the bright flame-colour which tips the *apex* of its lower jaw ; and secondly, in the full-bodied silver stripe extending horizontally along the middle of the body, from the *operculum* to the tail, one-tenth of an inch broad.

11. A specimen of a *Salmo* that I cannot find described any where, but which has a good deal of relation to the Smelt, in its sub-semitransparency, and some of its other characters, and still more to *Salmo fæstens*, except that its head is the reverse of “ truncated.”

12. A specimen of our White Grunt, Bloch's *Anthias formosus*. If it keep its colours, you will see how very differently it is striped from the representations in Shaw, Vol. IV. of Gen. Zoology, pl. 64, p. 439, and in other works.

I come now to another class of animals, for which I hope that I may invoke the aid of Mr. Bell: I mean, that of Reptiles. Dr. Brown has mentioned only three kinds of Snake here, but there are more in the island than he knew of. I have been endeavouring to obtain some of each kind, and I now send three sorts, all I have yet succeeded in getting. They are as follow:—

13. Two specimens of Brown's *Coluber*, No. 2. He has spoken of it as "very slender," but this is wrong; it is the tail only that is so, and it is remarkably long, as compared with its body. Brown's description being imperfect, a new one is much wanted, and if it come from Mr. Bell, and if a figure may accompany it (and the other Snakes I now send), drawn with the accuracy, elegance, and mastery of hand that mark the figure of *Dryinus auratus*, in the 2d Vol. of the Zoological Journal, I shall be most happy in having sent the specimens where such justice shall be done to them. I send in a small paper, here inclosed, some of its scales; near the *apex* of each of the dorsal ones will be observed a faint minute dot, a peculiarity I do not recollect to have seen noticed by any naturalist as to the scales of *Ophidia*.

14. Two specimens also of our Whip-snake, which, I presume, will come under Mr. Bell's sub-genus *Leptophis*. I cannot but think that it is yet undescribed, and there is another peculiarity in its dorsal scales, that they are likewise dotted near their *apices*; but bi-punctated. Some of the loose scales are in a paper in the box. As both *Dryinus* and *Leptophis* have been separated from the *Colubres*, there seems wanting some explanation concerning the caudal *scutella*, which in the figure just mentioned of *Dryinus auratus*, are drawn as single, instead of double, as usual among the *Colubres*. My Whip-snake has its *scutella* double. The specimens come from St. Mary's Parish.

15. A specimen of a Snake caught in the woods not long ago, and accounted to be very rare here, and very poisonous also; but this is an error, as I have examined its mouth, and besides the usual structure as to the palatine and maxillary ranges of innocuous teeth, I have extracted three of those which, were it poisonous, would be fangs, and they are imperforate. These teeth are inclosed in a paper within the box. This Snake seems to fall under Daudin and Cuvier's sub-genus *Eryx*.

16. A specimen of *Anolius*, not uncommon about Kingston. It is

neither Brown's *Lacerta*, No. 7, nor his No. 8, as I conceive. Three of its eggs, as I suppose them to be, are sent in the phial.

17. In the phial are some specimens of a native Leech of this island, clearly nondescript. They are slightly shrunk from the action of the spirit, but they never, I believe, grow larger than the present ones were originally. I put into spirit some individuals bearing *ova* on their *abdomen*; and some others in which, there having been no moisture, the young were adhering to the belly, which they continued to do for some days. This species appears to be destitute of teeth, since none have ever incised my skin, in any trial I made with them.

18. Three specimens of Brown's *Cancer*, No. 1, taken from some Mangrove Oysters. There are besides, in the phial, some of our Wood-Ants, and other things not worth particular mention.

As I have proceeded with this letter (*currente calamo*) I have felt almost vexed at the length to which it was extending; and therefore I will not now add to it, except to say that I have no hesitation in acceding to the offer you have made to me of giving my paper on the Manta a place in your Journal, but I wish to have a few alterations previously made, and these I will send you very shortly.

I have the honour to be, Sir,

Your very obedient and humble Servant,

E. N. BANCROFT.

Notes on the Fishes referred to in the preceding Paper. By
E. T. BENNETT, Esq., F.L.S., &c.

THE Shark, numbered 4, evidently belongs to the aberrant section distinguished by M. Cuvier in his genus *Scyllium*, as having the anal fin placed farther back than the second dorsal, the temporal orifices very small, the fifth branchial opening frequently concealed in the fourth, and the lobules of the nostrils generally so prolonged as to resemble beards. All of these characters, except the latter, are possessed by the specimen transmitted with Dr. Bancroft's communication. The length of it is about one foot, and its colour (in spirit) is brownish above, and somewhat fawn-coloured beneath, marked on both surfaces, over the whole

of the body and the fins, by small black rounded spots, not closely set, and somewhat regular in their distribution. It agrees well with the figure given by Parra, t. xxxiv., f. 2., on which was founded Schneider's *Squalus punctatus*, Syst. Ichth. p. 134, erroneously placed in his section "B. "Foraminibus temporum carentes," &c. The only differences worthy of notice are, that in Parra's figure the branchial openings are placed wholly in front of, and not partly above, the pectoral fins; and that these openings are all exhibited as distinct, whereas the fifth is partially concealed in the fourth. Parra's specimen appears to have been even smaller than that of Dr. Bancroft, "tan pequeño como que se sacó del vientre de su madre;" and he states that he describes so young an individual because he could not obtain any of larger growth. According to him, "El color de todo el es ceniciento, sembrado de varias machas negras redondas que lo hermosean mucho." It is called Gata by the Spaniards of Havana.

A remark made by M. Broussonnet will account for the apparent difficulty, but more probably the absolute impossibility, of procuring individuals possessing the characters of the *Squalus punctatus*, Schn., of larger size than those obtained by Parra and by Dr. Bancroft. M. Cuvier regards this species as identical with the *Barbillon* of Broussonnet; and this opinion is almost unquestionably correct. Now Broussonnet states expressly that in his species, the young, while not exceeding one foot in length, exhibit small, round, black spots, which are not found on the larger individuals, some of which attain the length of five feet. On the description of the *Barbillon* given by Broussonnet is founded the *Squalus cirratus*, Gmel., which is properly placed by Schneider in the section possessing temporal orifices. The location by the latter of the *Sq. punctatus* among those Sharks in which these openings are wanting, may readily be accounted for by the extreme minuteness of the orifices, which in our specimen could not be detected without much difficulty, and into which the point of an anatomical blowpipe could not be introduced.

By some oversight M. Cuvier refers the *Barbillon* of Broussonnet to the *Squalus barbatus*, Gmel., instead of the *Sq. cirratus*, Ej. The *Sq. barbatus* is founded on the description of the *Barbu* of Broussonnet, a very distinct species from a totally different locality.

To the same species with the one under consideration, for which the

name of *Scyllium cirratum* will of course be used, M. Cuvier also refers the *Squale pointillé* of Lacépède. Such an association would have been impossible to any one who did not enjoy the opportunity of examining the specimen described and figured by M. Lacépède. The words of that authour, at variance even with his figure, are diametrically opposed in every particular, except the relative position of the fins, to the appearances exhibited by perfect specimens of the fish, which, according to M. Cuvier, formed the subject of his description.

5. Is the *Zygæna Malleus* of M. Valenciennes, to whom we are indebted for an excellent Monograph of the genus, published in the *Mémoires du Muséum d'Histoire Naturelle*. M. Valenciennes has pointed out four well defined species, which he has carefully described. He has also given representations of the upper and under surfaces of the head in each species. We have therefore here a standard production to which recourse may be had. In the *Zyg. Malleus* the head is more produced on the sides than in the other species; its front is nearly straight, with a notch on each side near the nostrils; and the nostrils are situated very near the outer angle of the head. M. Valenciennes mentions as its habitats, the coasts of France, the Mediterranean, and Brasil; to these may now be added the West Indian Seas.

8. is the *Serranus Ouatalibi*, Cuv. and Val., recently described in the *Histoire Naturelle des Poissons*, II, 381. It was figured by Parra, t. v. f. 2, and with f. 1. of the same plate, constituted in Schneider's *System* a species of *Bodianus*, under the name of *Guativere*. The fish represented in the latter figure, is distinguished by MM. Cuvier and Valenciennes as the *Serranus Guativere*, solely on the authority of Parra, no specimen of it having yet reached them.

9. is the *Belone Carribæa* of M. Le Sueur, by whom it and several other species were first distinguished from the common European *Belone*, in the *Journal of the Academy of Natural Sciences of Philadelphia*, ii. 127. It is known by the equality of its mandibles; the greater prolongation backwards of its dorsal than of its anal fin; the greater length of the lower lobe of its caudal fin; the flattened form of some of the rays of the fins; and several other peculiarities which distinguish it from the rest of the genus.

10. Notwithstanding the assistance afforded to us by M. Le Sueur, in

his description of several species of *Hemirhamphus*, Cuv., forming part of the paper just quoted, there is some difficulty in determining the present fish. It can be neither of the West Indian species there mentioned, for, with a body four times the length of the lower mandible, it has dorsal and anal fins of equal length. In these particulars, in the silvery band along the side, and in the relative length of the pectoral fins (one half) to the lower jaw, it agrees with the *Hem. erythrorhynchus*, Le S.; the name of which, although no mention is made of such a marking, would appear to indicate the existence of some red on the beak, perhaps confined to the tip, as pointed out by Dr. Bancroft. But the upper mandible in our fish is certainly not "about the length of the diameter of the eye," scarcely exceeding one half of that diameter; the number of fin-rays is somewhat different, being D. 15, A. 16, instead of D. 16, A. 18; and the locality is perfectly distinct, M. Le Sueur's *Hem. erythrorhynchus* having been obtained by him and M. Péron, in the East Indian Seas. These differences induce me to regard Dr. Bancroft's fish as distinct from all those of M. Le Sueur. It is evidently the "Orphie de Rio-Janeiro, *Esox dorso monopterygio, rostro apice coccineo, lineâ laterali lata, argenteâ*," &c. of Commerson's MSS. as quoted by Lacépède; in whose *Histoire Naturelle des Poissons* it forms part of his *Esox Gambarur*, a medley composed of this western species, of the *Hem. marginatus* from the Red Sea, and perhaps of a third. With it, however, is not associated by M. Lacépède the *Esox Brasiliensis*, Linn., as stated by M. Le Sueur; who must also be in error in regarding one of his West Indian species as the *Esox marginatus*, Forsk.

I trust that Dr. Bancroft's exertions will enable him to procure specimens of the other western *Hemiramphi* for comparison; and should the present prove to be distinct, as I apprehend it will, I would propose for it the trivial name of *apicalis*.

11. This fish is referable to the sub-genus *Saurus*, Cuv., and is certainly nearly related to the *Salmo fatens*, Linn. Without extensively consulting specimens, it would be impossible to determine any species of a group so comparatively numerous, and mostly differing from each other only in particulars requiring close examination.

12. To the species figured by Bloch, tab. CCCXXIII (copied in Shaw's *General Zoology*), the fish transmitted by Dr. Bancroft cannot be referred. It differs in its markings totally, as that gentleman remarks, from Bloch's

Anthias formosus, the *Hæmulon elegans*, Cuv. MSS., for, instead of the longitudinal *vittæ* we have here numerous oblique lines. This character distinguishes it equally from every other described species with which I am acquainted of the genus *Hæmulon*, recently proposed among the *Sparidæ* by M. Cuvier, with the single exception of his *Hæm. heterodon*, the *Diabase rayé de jaune* of M. Desmarest. In this latter there are, however, three *vittæ* along each side of the back, which are wanting in our fish, the oblique lines being continued in it to the base of the dorsal fin. I would therefore propose to characterize it as a new species.

DIABASIS OBLIQUATUS. *Diab. flavescens, capite vittis cæruleis duodecim, corpore lineis cæruleis obliquis numerosis.*

D. $\frac{1}{1}\frac{2}{6}$. P. 15. V. $\frac{1}{6}$. A. $\frac{3}{1}\frac{2}{2}$. C. 16.

On a yellowish, somewhat fuscous, ground, (perhaps altered by the spirit in which the specimen has been immersed for about three months,) the markings are pale blue, in numerous *vittæ*: those on the head and *opercula*, which are somewhat broader, and more deeply coloured than those of the body, are nearly longitudinal, about twelve in number: those of the body are oblique, directed upwards and backwards. The latter are formed by lines passing across the middle of each scale, and are consequently numerous, not less than sixteen or seventeen being crossed by a line drawn from the junction of the spinous and soft portions of the dorsal fin to the belly in front of the *anus*. On the tail, behind the dorsal and anal fins, the markings become longitudinal, in about nine rows. The fins, especially in their scaly soft portions, are more fuscous than the body: into these the markings do not extend. The lateral line, deflected opposite to the extremity of the dorsal fin, is yellow, and is accompanied below by a blue line; a similar line, but more indistinct, passes along its upper edge. The caudal fin is forked; the spines of the dorsal are filamentous.

The front and the extreme teeth in each jaw, especially in the upper, are longer and stronger than the others, and are somewhat hooked; a variance from the generic mark "dents en velours" indicated by M. Cuvier. His characters may perhaps be erroneous in this respect, or the structure may be peculiar to the present species, the only one of the genus I have yet examined.

In this description I have omitted several points which form part of the generic marks indicated by M. Cuvier, whose name for the genus (*Hæ-*

mulon) should give way to the prior claim of that of *Diabasis* proposed by M. Desmarest. It is to be feared, however, that in such a case the weight of M. Cuvier's authority will bear down all opposition, and that even the principles of nomenclature, if he persists in retaining the appellation he has proposed, will in vain be urged against one who has engaged in his favour the gratitude of every ichthyologist.

E. T. B.

ART. XIX. *Post Mortem Examination of a Female Orang Outang. In a Letter addressed by J. GRANT, M.D., to the Secretary of the Zoological Society.*

SIR,

IN the latter part of the year 1828, an Orang Outang that passed for a female and was supposed to be about three years of age, was presented to Mr. Swinton, of Calcutta. She was sent from Singapore, where she had lived for some time, and was, in all probability, a native of Borneo.

She was of a mild, docile, and melancholy disposition, and had been taught to walk in the erect posture, which she was very fond of assuming of her own accord.

Although reputed a female, some doubts arose respecting the sex of the animal. At length, after as careful an examination as the restlessness and timidity of the creature would permit of, the great probability of her being a female was generally concurred in.

There was no appearance of either *vulva* or *labia*, and at the first glance it was not surprising that the animal should be by some mistaken for a male, for a small flaccid *penis*-like body, about an inch in length, was visible under the *pubes*. This being found imperforate, and devoid of any appearance of *scrotum*, or *testes*, was pronounced a *clitoris*. On raising it, or pushing it to one side, a small aperture was observed near its root, capable of admitting the end of a crow-quill, and through which the urine passed, but whether this aperture was the *urethra* itself, or a common passage behind which was the proper *urethra* and *vagina*,

could not be determined while the animal was alive. But the impression was, that this animal was a proper female, with her genital parts imperfectly developed.

Having premised so much, I come now to the illness and death of the animal. In January last, the creature became much emaciated, appeared to suffer considerably, and to be very sensible of cold. Accordingly, about the end of that month, it was sent for medical treatment to my friend Mr. Breton, with whom she remained about three weeks, until she died, on the 14th of February. I have been favoured by Mr. Breton with the following particulars of her illness. “ On my first examining the
 “ animal, it appeared to me that its lungs were affected ; since it had a cough
 “ which was sometimes violent, difficulty of breathing, fever attended
 “ with a very quick pulse, loss of appetite, and costiveness. The cough
 “ at night was generally violent at intervals, but during the day it was less
 “ so. The animal coughed and moaned at times like a human being. It
 “ never expectorated in the smallest degree. It seemed to feel the effects
 “ of cold air, and it remained in a recumbent posture under a blanket in
 “ a room in the early part of the mornings, and in the evenings. Every
 “ now and then it would of itself go out in the sun, remain there a little
 “ while, and then return to its bed and cover itself with the blanket.
 “ Every day, till within a day or two of its death, it partook of plantain,
 “ milk, and some plain sweet cakes. It never at any time seemed oppressed by thirst. Its skin, whilst the fever continued, was hot, but
 “ the heat was not very considerable. The fever intermitted, but the
 “ intermissions were never at regular periods. At times the animal remained without fever a whole day, at other times the fever continued
 “ two or three days without intermission. No cold fit was ever observed.
 “ The paroxysms came on invariably with heat, and while under its
 “ effects, the poor animal manifested anxiety and uneasiness. It seldom had a natural motion. Stools were procured by enemas given
 “ every other day. Purges were attempted to be given, but a sufficient
 “ quantity could not be forced down the throat so as to produce any sensible effect. Doses of half a grain of tartar emetic were mixed with
 “ milk, and this the animal drank of itself, but without any effect.
 “ Sometimes it appeared lively, at other times very dull and languid, and
 “ in this state it continued and languished until it died.”

Mr. Breton, Dr. Adam, and myself examined the body a few hours after death, and as there was an anxious wish to preserve the remains as much as circumstances would permit, for the purpose of being sent to the Zoological Society, a minute dissection would have been inconsistent with this object. The examination that took place was therefore cursory, and had more particular reference to the discovery of the cause of death and the solution of doubts respecting the generative system of the animal.

In opening the cavity of the *abdomen*, the *parietes* were found much thinner than in the human species; the colour of the skin in the line of incision was of a rather deep blue, and the skin itself was strong and thick compared with that of other varieties of *Simiæ*. The stomach, liver, *caput cæcum coli*, and bowels generally bore a strong resemblance to the human, both individually and in relative position. A serous effusion had taken place in the peritoneal sac, and the stomach was distended with air. The *caput cæcum* was filled with indurated fæces, and attached to the *caput* was, as in man, an *appendicula vermiformis* about four inches long. The *pylorus* was remarkably well defined, with the same strong resemblance to the human as that possessed by other organs. The *duodenum* also was formed as in man.

In his valuable work on Comparative Anatomy, Sir Everard Home states, that, in a long-tailed Monkey the intestines were very nearly the same as in man, and that there was an *appendicula cæci* of a pyramidal form, and about half an inch long. In another Monkey, the *appendicula cæci*, it is stated in the same work, was entirely wanting; in a large black Monkey (quære Gibbon) it was found three inches long; and in the Baboon it was wanting. Dr. Adam a few days before had examined a Lungoor (*Simia Entellus*, Dufresne,) which had no vermiform appendicle to the *caput cæcum* nor proper *pylorus*. In the animal under consideration, as already mentioned, the *pylorus* was well marked, and there was an *appendicula vermiformis*.

The whole of the abdominal *viscera* were more or less in a morbid state, there being tuberculous *maculæ* on the liver, and tubercles in the spleen, stomach, *omentum*, mesentery, &c.: the tubercles when cut into exhibited a whitish cheesy structure. The spleen was one mass of tuberculous disease, and was found strongly adhering to the stomach and *parietes* of the *abdomen*. Near the inferior part of the stomach, point-

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ing more to the right, a very small supplementary spleen existed. The liver, though covered with tuberculous *maculæ*, when cut into exhibited in its interior no tubercles. The mesenteric glands were also filled with the same cheesy substance mentioned above, and one large mass was in a state of partial suppuration.

The cavity of the *thorax*, generally speaking, was in an equally diseased state with that of the *abdomen*. A purulent serous effusion had taken place, with adhesion of the lungs, more especially the left lobe, to the thoracic *parietes*. On cutting into the left lobe, it was found converted into a mass of cheesy tubercles, but no suppuration had taken place; the appearance of the right lobe was similar, but the disorganization was less in degree. The heart was sound.

On the whole, from the appearances manifested on examination, it was obvious that the Orang Outang had died from the effects of general inflammation of the thoracic and abdominal *viscera*, but whether this had commenced with the abdominal or thoracic is not easy to determine. The brain was not examined.

On examination of the sexual organs of the Orang Outang, some difficulty arose in duly ascertaining them, on account of the minuteness of some of the parts. On introducing a director into the external *meatus* beneath the root of the *clitoris* (which, as already stated, was only large enough to admit the end of a crow-quill) an incision was carefully made down the *perinaeum*. On thus laying open the external *meatus*, two orifices or canals were discovered, the upper one of which quite under the root of the *clitoris* was found to be the *urethra*, and was large enough to admit a small bougie or probe into the bladder. The lower aperture or orifice of the *vagina* was large enough to admit a common-sized pencil. The canal was about an inch and a half long, evidently dilatable, and of the diameter (undilated) of a common pencil-case. A blunt probe introduced into it was felt with the finger in the *pelvis*, where it met resistance from the *os tincae* of a small *uterus*, which it required minute search to find; but the existence of which, with its fallopian tubes and ovaries was satisfactorily demonstrated; thus the question of the creature's sex was set at rest.

The pectoral air-sacs or membranous bags peculiar to the Orang species, and communicating with the *larynx*, were found very distinct, but

these have already been so accurately described by other observers that it is unnecessary further to notice them.

I would suggest to the Zoological Society a careful dissection of the right arm, as it appeared to us, upon the hurried examination made of the left arm of the animal, that it possesses a *sterno-humeral muscle* not to be found in man. The pectoro-laryngeal sacs and this muscle were the only striking instances of departure from the human model which we observed. The muscle in question appeared to rise fleshy from the upper part of the *sternum*, proceeding in a straight line to be inserted into the *humerus* upon its external surface, and a little below the neck of the bone. Its action would seem to be, to roll the *humerus*, and to bring the arms across the body, thus helping the animal to take hold in climbing, &c.

J. GRANT.

Calcutta, March 1829.

ART. XX. *On two new Genera of Testaceous Mollusca, and five new Species of the Genus Anatina, lately discovered at Port Jackson, New South Wales; in a Letter from Mr. SAMUEL STUTCHBURY, A.L.S.*

TO THE CONDUCTORS OF THE ZOOLOGICAL JOURNAL.

Gentlemen,

AMONG a parcel of shells just received from Port Jackson, New South Wales, two, which appear to have been hitherto undescribed, have particularly interested me. Their peculiar characters prevent their admission into any of the genera yet known, without giving greater latitude to established limits than would, I think, be consistent with the true interests of science. Although they both possess an internal testaceous appendage to the hinge, characteristic of the shells placed by Lamarck in his genus *Anatina*, (though not mentioned by him,) it will surely be allowed that the habits and economy of an animal having the power of locomotion must differ so widely from those which have not, that the

fact of the shells under notice being constantly attached, did there exist no other difference, would itself be a sufficient reason for regarding them as distinct from *Anatina*. Under these circumstances, I have thrown together such observations as will point out their distinguishing peculiarities until further information may confirm the propriety of continuing them as genera, or enable us to ascertain their true affinities, and correct situation in the system. The first I propose to call

MYOCHAMA.*

Testa inæquivalvis adhærens. Valva affixa dentibus duobus marginalibus, divaricatis, ad umbonem disjunctis, foveolâ trigonâ intermedia alteram testaceæ appendicis extremitatem, cartilagine cornedâ connexam, excipiente. Valva libera dentibus duobus inæqualibus, parvis, divaricatis, alterâ appendicis extremitate foveolæ intermediæ insertâ. Umbones valvæ liberæ internè, alterius externè, recurvi. Impressiones musculares duæ, orbiculares, distantes, laterales. Impressio muscularis pallii sinu brevi, lato. Ligamentum tenue, externum.

At first sight this shell might be passed over as an *Anomia*, but it may readily be distinguished by examining the attached valve, which will be found to be destitute of the foramen; from *Cleidothærus* it differs in wanting the conical tooth of the hinge, as well as in the shape of the muscular impressions, in having a sinus in the muscular impression of the mantle, and in the attached valve being the smaller. The following characters will at once distinguish it from every other genus. Shell inæquivalve, adhering; the attached valve with two unequal diverging marginal teeth, separated at the umbo by a triangular pit, in which one end of a testaceous appendage is inserted and connected by a horny cartilage; the free valve with two unequal, small diverging teeth, close under the umbo, in which is inserted the other end of the testaceous appendage. The umbo of the free valve is curved inwards, that of the fixed valve outwards. Muscular impressions two, nearly orbicular, distant, lateral. There is a short broad sinus in the muscular impression of the mantle.

* From the circumstance of the Shell thus named connecting in itself some of the characters of the *Myariæ* and *Chamaceæ*.

MYOCHAMA ANOMIOIDES.

TAB. SUPP. XLII. f. 1, 2, 3, 4.

M. testâ rosâ, tenui, fragili, costis prominentibus radiantibus dichotomis; valvâ liberâ valde convexâ; umbone extra apicem valvæ alteræ producto; epidermide tenui, pellucidâ; long. $\frac{1}{12}$, lat. $\frac{5}{12}$, alt. $\frac{0}{12}$.

Shell rose-coloured, thin, fragile, ornamented by prominent radiating dichotomous ribs. Free valve extremely convex, the umbo projecting beyond the apex of the other. Epidermis thin and transparent.

The shell described above adheres to a smooth species of *Pectunculus*; some specimens are attached to *Trigonia** *pectinata*, in which case the natural ribs are crossed by others still more prominent, corresponding with those of the shell on which they have grown.

CLEIDOTHERUS.†

Testa submargaritacea, inæquivalvis, adhærens. Cardo, dente conico in valvâ liberâ, in fossulam alterius valvæ inserto, claviculâ testaceâ elongatâ recurvâ, cartilagine connexâ, et in cicatrici profundâ infra utrumque umbonem insertâ. Impressiones musculares, in utraq; valvâ duæ, laterales, antica prælonga, postica sub-orbicularis. Impressio muscularis pallii integra. Ligamentum externum.

Shell somewhat pearly, inæquivalve, adhering. Hinge with a small conical tooth in the free valve, fitting into a corresponding pit in the attached valve. A testaceous, elongated, curved clavicle, connected by cartilage, is inserted in a deep cicatrix under each umbo. Muscular impressions two, lateral, the anterior lingulate, the posterior suborbicular. Muscular impression of the mantle entire. Ligament external.‡

* It may not be thought irrelevant to mention that *Trigonia* must be removed from the situation Lamarck has given it, between the *Arcaceæ* and *Naiades*, to the *Cardiaceæ*; having seen the living animal, I am convinced it bears the nearest affinity to that family.

† From the *Clavicle* in the *hinge*.

‡ Since this Article was sent to press, it has been ascertained that *De Roissy* has named and characterized this remarkable genus, though evidently from incomplete specimens. He has called it in French "*Camostrée*" a name so

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In general contour, this shell has so great a similitude to *Chama*, that without opening it there would be no hesitation in pronouncing it of that genus, belonging to Lamarck's division, "Crochets tournant de droit à gauche." Its internal differences are given in the generic description. The species I characterise as follows :—

CLEIDOTHÆRUS CHAMOÏDES.

TAB. SUPP. XLII. f. 5, 6, 7, 8.

C. testâ involutâ, rufâ, internè subviridi sub-margaritaceâ; valvâ dextrâ majore profundâ, latere antico adhærente; latere convexo claviculæ sulcatâ.

Shell involute, brownish red, internally of a greenish pearly lustre, attached by the anterior side of the right valve, which is of great depth; left valve but slightly convex; the clavicular appendage with a groove on the convex side.

My specimens being destitute of colour, the figure has been taken by G. B. Sowerby, jun., from one in his father's collection, which he found among the stores of the late Mr. Humphreys, but which, not having the clavicular appendage, had been laid aside, until more perfect specimens should decide its true characters. Mine were found attached to sand-stone rocks by T. Young, Esq., R. N., together with an *Aspergillum* (perhaps agglutinans of Lamarck), some *Chamæ*, &c. while searching near the entrance of Port Jackson, pointed out to him as the spot where I discovered, in 1286, the first living *Clayagellæ*.

The five following shells bear so close an analogy to *Myochama*, that believing the four last to be inedited, I am induced to give specific descriptions of them, adding them to the genus *Anatina*. I must, however, premise, that the spoon-shaped teeth mentioned by Lamarck are absent in each, but they possess the moveable appendage to the hinge, found in most, if not all the shells placed in that genus by him.

entirely inapplicable that I hesitate not to retain the appellation of *Cleidotherus*, by which I had designated it. There is nothing in the shell to connect it with *Ostrea*.

ANATINA BREVIS.

TAB. SUPP. XLIII. f. 1, 2.

A. testâ plano-convexâ, sub-triangulari, transversim striatâ, valvâ dextrâ convexâ, costis duabus depressis, transversim lamellosis, supra extremitatem posticam positis; valvâ alterâ subconcavâ, margine dorsali inflexo et in sulcum alterius valvæ inserto: cardine cartilagine internâ trigonâ et appendice testaceâ intermediâ: umbonibus posticè reflexis: impressionibus muscularibus distantibus, laterali-bus: impressione pallii sinu lunari; long. $\frac{1}{1\frac{1}{2}}$, lat. $\frac{4}{1\frac{1}{2}}$, alt. $\frac{1}{1\frac{1}{2}}$.

Shell plano-convex, subtriangular, transversely striated. Right valve convex, with two depressed transversely lamellated ribs upon the posterior extremity. Left valve slightly concave, dorsal margin inflected, and inserted into a sulcus in the opposite valve. Hinge with an internal triangular cartilage, and a supervening small shelly piece. Umbo reflected posteriorly.* Two distant muscular impressions; a lunate sinus in the impression of the mantle.

A figure of this shell was given by Mr. G. B. Sowerby, in his Appendix to my Sale Catalogue as *Pandora brevis*, the cardinal appendage being overlooked by him, or (which is more probable) it was lost before he had the shell.

ANATINA PANDORIFORMIS.

TAB. SUPP. XLIII. f. 3, 4.

A. testâ plano-convexâ, subovatâ, striis transversis distantibus; valvâ dextrâ convexâ, extremitate posticâ carinatâ truncatâ; valvâ alterâ subconcavâ: cardine appendice planâ fossulis cardinalibus cartilagine adhærente; lineâ depressâ subobsoletâ, internâ, ab umbone versus marginem inferiorem obliquè decurrente; long. $\frac{9}{1\frac{1}{2}}$, lat. $\frac{4}{1\frac{1}{2}}$, alt. $\frac{7}{1\frac{1}{2}}$.

Shell plano-convex, subovate, with transverse distant striæ. Right valve convex, the posterior extremity carinated and truncated; left valve slightly concave. Hinge with a flat testaceous piece attached by cartilage

* Contrary to every other genus examined, applying the term posterior to the side where the siphons are situated.

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to the cardinal pits : a nearly obsolete depressed line obliquely crossing the internal disk of each valve, from the umbones to the inferior margin.

ANATINA CRASSA.

TAB. SUPP. XLIII. f. 5, 6.

A. testâ crassâ, subtrigonâ, inæquivalvi, transversim costatâ ; valvâ sinistrâ convexiusculâ, latere postico utriusque valvæ carinato ; depressione lavi, cordatâ, ad latus posticum umbonum ; impressionibus muscularibus profundis ; long. $\frac{6}{12}$, lat. $\frac{3}{12}$, alt. $\frac{5}{12}$.

Shell thick, subtriangular, inæquivalve, transversely ribbed ; left valve but slightly convex, posterior side of both valves carinated, with a smooth cordate depression on the same side of the umbones ; muscular impressions deep. Although the smallest species we have seen, it is probably the thickest of the genus.

ANATINA OVALIS.

TAB. SUPP. XLIII. f. 7, 8.

A. testâ inæquivalvi, tenui, pellucidâ ; latere postico brevi, truncato ; valvâ dextrâ convexâ, margine superiore sulcatâ, marginem inflexum alterius valvæ recipiente ; valvâ sinistrâ convexiusculâ ; cartilagine cardinis internâ, obliquâ, elongatâ : impressione pallii sinu magno ; long. $\frac{8}{12}$, lat. $\frac{3}{12}$, alt. $\frac{6}{12}$.

Shell inæquivalve, thin, pellucid, posterior side truncated ; right valve convex, superior margin sulcated, receiving the inflected edge of the other valve ; left valve slightly convex. Hinge with an oblique elongate internal cartilage. Sinus of the impression of the mantle large. Now in the cabinet of Michael Bland, Esq.

ANATINA ELONGATA.

TAB. SUPP. XLIII. f. 9, 10.

A. testâ transversim elongatâ, inæquivalvi, pellucidâ ; sinu impressionis muscularis pallii versus latus anticum elongato ; long. $\frac{6}{12}$, lat. $\frac{2}{12}$, alt. $\frac{3}{12}$.

Shell transversely elongate, inæquivalve, pellucid, sinus of the im-

pression of the mantle elongated towards the anterior side. In Mr. Sowerby's possession.

Should the foregoing notices be deemed of sufficient interest to deserve a place in the Zoological Journal, I shall feel honoured by their insertion, and remain,

Gentlemen,

With great respect,

Your obedient Servant,

SAMUEL STUTCHBURY.

33, Theobald's Road.

ART. XXI. *Notice of the Habits of Bulinus hæmastomus.*

By Mr. W. B. BOOTH, communicated by W. J. BRODERIP, Esq., F.R.S., &c., Sec. G.S.

I AM indebted to the kindness of Mr. Sabine, Secretary of the Horticultural Society, for the following interesting Note on the habits of a specimen of *Bulinus hæmastomus*,* which lived for more than a year in a hot-house in the Society's garden at Chiswick. The soft parts had suffered materially from the cause which occasioned the death of the animal; but the general condition of those parts, and of the shell, indicated the best health at the time when an unfortunate accident deprived it of life. The specimen, which was of the usual full-grown size, has been presented to the Zoological Society by the hands of Mr. Sabine. The Note was written at Chiswick, by Mr. W. B. Booth.

W. J. BRODERIP,

London, Dec. 1829.

NOTE.—It was brought from Rio, in October, 1828, by Mr. William McCulloch, then gardener to the Right Honourable Robert Gordon, and

* *Bulinus hæmastomus*, Scopoli. *Bulinus oblongus*, Brug. *Bulla oblonga*, Chemn. *Helix oblonga*, Mull., Gmel., and Daudeb. *Turbo hæmastomus*, Gmel.

presented by him to the Horticultural Society. At first it appeared rather sickly, but after it had been kept in the hot-house for some time, it recovered, and began to move about. It cannot now be correctly ascertained when it produced the first egg, but it was very shortly after its arrival. I should think about the beginning of November. This egg was sent, by the desire of Mr. Sabine, to the Zoological Society. About the same time this year, it produced a second egg, and three weeks afterwards, a third;* the latter was unfortunately broken by the animal itself, but the former is still in preservation. It fed upon lettuces and the tender leaves of cabbages; the former seemed to be its favourite food. Sometimes it would devour two large lettuces, and then remain for days afterwards without touching food, or moving from its place, except when cold water was sprinkled upon it. During the day it was usually in a dormant state, in the shade: but towards the evening, when the house was moist and warm, it would spread itself out, and move from one part to another. It seemed to like moisture, and I have no doubt that it might have been preserved for years, if it had not been accidentally killed. On Saturday last it was at the end of the house where the fire comes in, and ventured too far upon the hot bricks after they had been watered. In the morning it was found fixed to them, and quite dead.

W. B. BOOTH.

ART. XXII. *On the occurrence of a new British Warbler.*

By MR. JOHN GOULD. *In a Letter to N. A. VIGORS, Esq.*

SIR,

I HOPE to be excused the liberty I have taken in thus addressing to you, in the form of a letter, the following short account of the occurrence of a European bird, which, as far as I am acquainted, is new to the British Fauna.

When we consider that European ornithologists have enumerated in

* These eggs were as large, and appeared to be as fully developed, as those produced by the animal in its native country. Two representations of these eggs are given in Tab. Suppl. xvi, bis. f. 3, 4.

their systematic catalogues more than one hundred birds unknown to our own shores, it may appear surprising that researches in this class are not more frequently rewarded with new objects, their power of flight, and extent of migration being duly appreciated. Many rare birds probably escape unnoticed, others unknown, and some unrecorded.

The foliage of our extensive woods and thick hedgerows affords impervious shelter to the smaller summer visitors, and it is to one of the numerous family of the Warblers, whose habits confine them to such localities, that I now refer.

This bird was shot at Kilburn, on the 25th of October, by my friend, Mr. Frederick Bond, who has kindly allowed me to make any comment I may think proper. It was at first believed to be a variety of the Redstart; but on closer investigation a comparison was instituted by which the real difference was ascertained; the individual proving to be the black Redtail of Latham's Synopsis, Vol. IV., page 486, Sp. 16; the *Sylvia Tithys* of the same author's Ind. Orn., Vol. II, page 512, Sp. 16; and the *Bec-fin rouge-queue* of M. Temminck's Manuel d'Ornithologie, Vol. I, p. 218. It is correctly figured (under the latter name, though with the wrong Latin appellation of *Sylvia succica*) in Werner's Atlas des Oiseaux d'Europe, which is intended as an illustration of the Manuel just quoted.

The length of this bird is $5\frac{3}{4}$ inches. Its beak black; the head, back, and neck dusky slate-colour; the chin and *abdomen* somewhat lighter; the upper and under tail-coverts chestnut; the wing-primaries dusky, their edges ash-colour, and shafts black; the two middle tail-feathers dusky black, and all the others chestnut.

Adult males of this species have the general plumage of the body darker, and the chestnut-coloured parts more bright.

This bird appears to be found over an extensive portion of the north of Europe, but according to M. Temminck is only occasionally seen in Holland. It is at once distinguished from our Redstart by its dark breast and under parts, the whole of which in our well-known *Sylvia Phænicurus* are of a bright chestnut.

I avail myself of this opportunity to notice the occurrence of a third specimen of the *Plectrophanes Lapponica*, a species described by Mr. Selby, in the 15th volume of the Transactions of the Linnean Society

of London. This fresh example of the *Emberiza calcarata* of M. Temminck was taken by a bird-catcher, in September, 1828, in the vicinity of London, and its plumage so nearly corresponds with the description given by Mr. Selby, at page 158 of the volume of the Transactions referred to, as to make any additional remarks unnecessary.

I have the honour to be,

Your obedient humble Servant,

JOHN GOULD.

33, Bruton Street.

ART. XXIII. *Analytical Notices of Books.*

A Descriptive Catalogue of the Lepidopterous Insects contained in the Museum of the Honourable East India Company, illustrated by coloured Figures of new Species, and of the Metamorphosis of Indian Lepidoptera, &c. By THOMAS HORSFIELD, M.D., F.R.S., L.S., and G.S., &c. 4to., Parts I. and II.

IN a previous notice of this important Work, in which we confined ourselves to an analytical exposition of the views advanced by Dr. Horsfield in his Introductory Remarks, we gave an outline of the general arrangement of the *Lepidoptera* propounded by the authour, enumerated the tribes into which he regarded the order as naturally divisible, and explained the characters of each of the *stirpes* composing the first tribe, that of *Papilionidæ*. Having been induced by the novel and interesting nature of the views which we had then to notice to extend our analysis to a greater length than usual, we were compelled to defer that portion of it which contained the commencement of the descriptions of the genera and species of Lepidopterous Insects deposited in the East India Company's Collection. The Second Part of the Descriptive Catalogue having now appeared, we resume our analysis at the point where our previous notice terminated.

After giving a character of the order, accompanied by some observations on the important assistance to be derived in arrangement from the study of the metamorphosis, Dr. Horsfield thus characterises the *Papilionidæ*: “*Larva* pedibus sedecim, elongata, cylindrica, tarda; capite “globoso retractili; exserto, a corpore disjuncto. *Chrysalis* nuda, angulata, posticè alligata, sed vario modo suspensa; in Stirpe Anopluriformi subfolliculata lævis, et Lepidopterorum aliquorum nocturnorum chrysalidi similis. *Imago*: *Antennæ* multiarticulatæ, basi graciles, apice crassiores plerumque capitulatæ aut clavatæ, in paucis filiformes vel subsetacæ vel apice graciliore uncinato. *Alæ* insecto sedente erectæ, inferiores retinaculo nullo. In Stirpe Anopluriformi alæ posticæ tantum erectæ vel suberectæ. *Tibiæ posticæ* plerumque apice solo calcarato. “*Volatus* diurnus.” This character is succeeded by a Synoptic Table of the *stirpes* of the *Papilionidæ*, which exhibits at one view, with reference to each *stirps*, 1. the analogies borne by it to the genera of *Ametabola*, MacL.; 2. its characters as derived from the *metamorphosis*; 3. its characters as derived from the perfect insect; 4. its synonyms; and 5. the genera comprehended in it, these latter being distinguished into normal and aberrant. The characters of the *stirpes* here given corresponding essentially with those contained in the Introduction, it is unnecessary for us to repeat the outline of them which we formerly gave at pages 122, 123, and 124, of our fourth volume.

Commencing his descriptions with the Vermiform stirps, Dr. Horsfield again characterises its *larva* and *pupa*. Owing to the want of sufficient materials, he expresses his inability to proceed to the subdivision of this group into families so as clearly to define them. He states, however, that the genera *Petavia*, *Polyommatus*, *Lycæna*, *Thecla*, and *Myrina*, are respectively representatives of so many families, the precise limits of which can only be determined by accurate and extensive investigation. Examples of each of the genera above enumerated, and of two others belonging to this *stirps*, are contained in the collection.

In the genus *Polyommatus*, a new subgenus is distinguished under the name of *PITHECOPS*, by its “wings somewhat elongated; hinder wings “entire, regularly rounded, and elliptical.” Its representative in India is the *Pith. Hylax*, the *Hesperia R. Hylax* of Fabricius, of which a figure is given. The same form exists in Europe in the *Pith. Alsus*,

Lysimon, *Pheretes*, and *Damon*. Of *POLYOMMATUS*, strictly so called, with the "margins of the hinder wings at the anal extremity angular, "and produced to a short point," two new species are described, the *Pol. Akasa* and *Pol. Puspa*, which may be respectively regarded as the Eastern analogues of the European *Pol. Argiolus* and *Pol. Arion*. The latter forms a natural transition, by its markings and habit, to the following genus.

Lycæna is distinguished from *Polyommatus* primarily by its *larva*, which in the latter genus is regularly rounded or cylindrico-gibbous, and in the former is more oblong and impressed at the sides. The only other mark of distinction between the genera is the form and habit of the wings of the perfect insect. Of *Lycæna* seventeen species exist in the collection, five of which are described as new. They are distributed into four sections founded, for convenience of reference, on artificial characters.

Of *Thecla* two prominent types of form have been determined, chiefly by the minute examination of the *tarsi* in both sexes, which Dr. Horsfield has pursued more closely and extensively than any other observer. The character obtained from the structure of the feet has been confirmed by that of the *antennæ*; and *THECLA*, strictly so called, is therefore characterized in the following terms: "*Antennæ* capitulo cylindrico-ovali, "utrinque manifestè attenuato; *tarsi* pedum anticorum maris articulo "solitario, cylindrico, ungue incurvo haud exserto." In the insects of this group, the hinder wings are furnished with an anal appendage, and a single tail. The *larva* of the only Indian species in which the metamorphosis was observed, is linear-oblong, depresso-scutate, and furnished with tufts of short bristles arranged in transverse rows at the segments. Of the nine species of this subgenus contained in the collection, five are now described for the first time. The subgenus *AMBLYPODIA* is distinguished by its "*Antennæ* è basi usque ad apicem sensim incrassatæ, "capitula haud distincta; *tarsi* pedum anticorum in mare articulo solitario inermi obtusissimo, superficie verticali abruptè terminato." Its *larva* corresponds in form with that of *Thecla*, but is covered entirely with short, delicate, solitary hairs; in one species, *Amblypodia Longinus*, Horsf., *Hesperia R. Longinus*, Fab., it is aberrant in form, being distended anteriorly, excavated at the sides, contracted behind, and

throughout transversely swelled at the segments. This subgenus is divided into the following sections, distinguished by the appendages of the hinder wings: 1. "Caudâ solitariâ obliquè divergente, cum appendiculo "anali elongato connatâ," illustrated by *Amblypodia Narana*, a new species; 2. "Caudis duabus distantibus exteriore minore, appendiculo "anali abbreviato," also illustrated by a new species, *Ambl. Vivarna*; 3. "Caudis tribus, intermediâ elongatâ, lateralibus minimis dentifor- "mibus, appendiculo anali brevi," of which four described species, including the *Papiliones P. R. Apidanus* and *Centaurus*, Fab., are in the collection; 4. "Caudâ solitariâ longissimâ, appendiculo anali lineari "subelongato," a single new species, *Ambl. Sugriva*, resembling in its markings the insects of the previous section, but approaching in its form to the true *Theclæ*; and 5. "Caudis duabus mediocribus subæqua- "libus, dente marginali conspicuo, appendiculo anali rotundato pro- "ducto;" of this section ten species are described, five of which appear to have been previously unnoticed.

Of *Myrina* two species are described. The first of these, *Myr. Ravindra*, Horsf., belongs to a section "Alis posticis caudis tribus, inter- "mediâ longissimâ, interiore mediocri, exteriore brevi denti marginali "adhærente," and preserves, in the painting of its lower surface, an affinity to the individuals of *Amblypodia*, although in essential characters it rigidly agrees with *Myrina*. The second, *Myrina Jafra*, Latr. and Godt., is referred to another section of the genus, "Alis posticis "caudis duabus denteque marginali prominulo; caudâ exteriore longis- "simâ, interiore mediocri."

LOXURA, a new genus proposed by Dr. Horsfield, agrees in various particulars with *Myrina*. But its *antennæ* are short, strict, more evidently incrassated towards the point, and provided at the terminal joints with more distinct bristles: its *palpi* are proportionally much longer, being full half the length of the *antennæ*: its *head* is comparatively narrow, and the eyes prominent: its *hinder wings* are lengthened and regularly attenuated to a narrow anal extremity; the anal appendage is angular, with a lateral projection, and an abrupt posterior termination; and they have a single tail, which passes off in an oblique direction. According to Dr. Horsfield's views, it stands in the series of the *Papilionidæ* near the confines of the Vermiform and Chilognathiform *stirpes*. Its

immediate relation to *Myrina* will be readily conceived from the agreement of their principal characters, the distinctions between them being chiefly derived from differences in the proportional length of parts. In external habit it resembles *Colias*, a group referred to the Chilognathiform *stirps*; the colour is spread over the surface in the same manner, and varies but little in the sexes; the margins are similar, and the metallic irrorations existing in *Myrina* are no longer observable; the markings underneath likewise are simple. The form of the hinder wings and the direction of the tail indicate also an affinity to *Gonepteryx*; but this resemblance, being founded entirely on an artificial character, is not insisted on. The insects in the East India Company's collection referred to this genus are the *Loxura Atymnus*, (*Papilio P. R. Atymnus*, Fab.), and a new species, *Loxura Pita*.

Another new genus, *PHÆDRA*, is proposed by Dr. Horsfield as a kind of appendix to the Vermiform *stirps*, in which its true position is not at present satisfactorily ascertained. Its metamorphosis is yet unknown; and the perfect insects referred to it possess a complication of characters, partaking of several genera, besides certain peculiarities of their own. In the structure of their *antennæ* they agree, upon the whole, with *Loxura*; and the *palpi*, although shorter than in that genus, are constructed on the same plan: in the anterior feet of the male they resemble the individuals of *Thecla*, strictly so called; but they differ from all the species of that genus and of *Lycæna* in the pulverulent covering of the under side of their wings, in their markings, and in the abrupt termination of the hinder pair. The first species enumerated, the *Phædra Terricola*, Horsf., (*Hesperia R. Phædrus*, ♂, and *Hesp. R. Æsopus*, ♀, Fab.) was arranged by MM. Latreille and Godart in their fourth great subdivision of the genus *Polyommatus*, comprising those with entire or slightly dentate wings; but although several of the insects of that section resemble it in the colour of the upper surface, they have nothing of the peculiarity which distinguishes the under side, and are all essentially different in a generic point of view. A second species is the *Phædra insularis*, Horsf., which differs from the preceding, not merely in marking, but also in the form of its hinder wings, indicating a sectional division in this small group. In *Ph. Terricola* these organs are broad and obtuse, with an abrupt regularly transverse posterior margin, gradually rounded to-

wards the outer apical angle: in *Ph. insularis* they are gradually attenuated towards the anal region, with a slightly rounded inner apical angle.

Having now arrived at the conclusion of the descriptions of the insects referred by Dr. Horsfield to the Vermiform *stirps* of *Papilionidæ*, we here again suspend for the present our analysis of his valuable work; deeming it better to defer our notice of those of the Chilognathiform *stirps* until the account of them, which is only commenced in the second Part, shall be completed. We shall then attempt to give a connected view of the whole of that great subdivision of the tribe, so far as it is illustrated by the East India Company's collection. To repeat our admiration of the beauty of the plates, the correctness of the figures, the nicety of the dissections, and the extent of the illustrations of the metamorphosis would be unnecessary. Far superior in scientific value to any which have yet been devoted to exotic insects, these illustrations are unequalled even by the most finished of those works in which the authours have applied themselves solely to subjects indigenous to the countries in which their publications were proceeded with, and where every facility for acquiring full information was consequently at all times in their power. To the extent, the accuracy, and the minuteness of the details conveyed in the text an almost equal praise is due. In the latter point even an exceeding is perhaps to be remarked, and this is particularly striking in that form of expressing the character of an insect which is usually regarded as indicative of its specific difference; it is here carried in many instances to the length of an extremely minute description. The laborious diligence of the authour is indeed every where remarkable. Each species is described with accuracy and precision from the materials in his immediate custody, and the extent and nature of these materials are in each instance specified: reference is made to other cabinets in which some of the insects are contained, especially to the very large collection of *Papiliones*, (Linn.), possessed by Mr. Haworth, and to the Banksian Cabinet, which now belongs to the Linnean Society, and which is most instructive on account of the names having been affixed to the specimens by Fabricius himself: the works of previous writers are referred to, and correct synonyms are thus obtained, while their errors are occasionally corrected: insects which have been before confounded together are ac-

curately discriminated : the essential differences between closely approximating species are pointed out : and the subject is, in short, investigated in all its branches with a precision, and to an extent which can scarcely be surpassed.

British Entomology, or Illustrations and Descriptions of the Genera of Insects found in Great Britain and Ireland. By JOHN CURTIS, F.L.S. Vol. V. [Nos. XLIX—LX.]

IN the fifth volume of his illustrations of the genera of our native Insects, Mr. Curtis has fully maintained the high character for beauty and correctness of delineation which we have held to be deservedly due to the four which have preceded it. He has also been no less successful in furnishing to the entomological student at least an equal share of novel information as to the objects of his pursuits with that contained in his earlier volumes. Of the forty-eight insects which occupy the plates before us, six only have been previously figured in British works; and no less than twenty-four, one half of the whole number, have been for the first time represented. Many of these are new as regards the species, and one of them presents a form which had not before been noticed by entomological writers.

This new form belongs to the family of *Staphylinidæ*, and is limited, so far as our present knowledge extends, to a single species, probably the *Evæsthetus æneopiceus* of Mr. Kirby's manuscripts. Mr. Curtis applies to it the name of *SYNTOMIUM*. It is nearly allied in form to the genus *Proteinus*, Latr., but is distinguished by its shorter *elytra*, which leave seven segments of the *abdomen* uncovered, as well as by its very differently formed *palpi*. Of the other *Coleopterous* genera, *Pterostichus*, *Colymbetes*, *Heterocerus*, *Berosus*, *Micropeplus*, and *Telephorus*, are illustrated by figures and descriptions of new species; and a third British species of *Berosus* is characterized, which had not previously been described. Of *Dromius*, *Clytus*, and *Orchesia*, the species selected for representation are new to this country. The only *Neuropterous* insect figured is also new: it is the *Hemerobius fimbriatus*. The seven *Hymenopterous* genera illustrated are extremely prolific in novelty; no less

than five of them, *Ichneumon*, *Pimpla*, *Anomalon*, *Dryinus*, and *Osmia*, being represented by new species. Of the latter genus a second new species is indicated; and of *Dryinus* no fewer than five others are described.

But the most interesting plate of the volume is that which illustrates the *Strepsiptera* by figures and dissections of a new species of *Stylops*, named, in honour of its discoverer, *Stylops Dalii*. Opportunities of examining insects of this order are so extremely rare, that entomologists are still at a loss with respect to many points, even of their external structure. Some of these have received considerable elucidation on the present occasion, and we are therefore induced to extract entire Mr. Curtis's description of *Stylops*, the only genus of the order that has yet occurred in this country. "Antennæ inserted between the eyes, near the
" crown of the head, membranous, perforated or punctured, composed
" of six joints, the basal one somewhat cup-shaped; second very short,
" transverse; third produced on the internal side into a dilated hollow
" lobe, extending beyond the fifth joint; fourth large, subclavate; fifth
" smaller, subovate; sixth as long, ovate, compressed. *Labrum* and
" *Mandibles* wanting? *Pharynx* visible. *Maxillæ* arising between the
" eyes, very remote at their base, conniving, long, slender, lanceolate,
" and horny. *Palpi* arising close to the *maxillæ*, large and robust,
" membranous, indistinctly pubescent, biarticulate, basal joint subconic
" form; second attached to the oblique apex of the first, oblong, somewhat truncated obliquely. *Mentum* very obscure. *Labium* and
" *Palpi* none. *Head* sessile, very broad and short, producing a large
" triangular lobe in the centre. *Eyes* very remote, lateral, globose,
" composed of numerous hexagons. *Prothorax* and *Mesothorax* very
" short rings, not so broad as the head. *Metathorax* very large and
" long, divided diagonally into four portions, and dilated very much on
" each side, producing a large *Scutellum* projecting over the *Abdomen*,
" which is small, soft, and composed of eight or nine joints, terminated
" by an incurved *Oviduct*? *Anterior wings* short and narrow, attached
" to the sides of the *mesothorax*, subcoriaceous, pubescent, thickened at
" the *costa* and inflated at the apex. *Posterior wings* attached to the
" *metathorax*, folded longitudinally when at rest, and meeting over the
" body, very large and membranous, the *costa* thickened, the nervures

“ very fine. *Legs* alike, four anterior approximating, first pair attached to the *antepectus*, second pair to the *medipectus*; third pair very remote, attached to the extremity of the *postpectus*. *Coxæ*, four anterior very large. *Tibiæ* not spined. *Tarsi* composed of four joints surrounded by a pubescent membrane, basal joint the largest, terminal the smallest, and notched at the *apex*. *Claws* none. *Larvæ* inhabiting the *abdomens* of living *Andrena*, the heads being exerted between the segments. *Pupæ* inhabiting the same situations.”

In the accompanying Plate are given various views of this singular insect, and also figures of the *larva*, both detached from the bee in which it dwells, and as it appears from between the segments of the *abdomen* of the *Andrena*. The *pupa* is also figured, which differs in several remarkable particulars from the *larva*, and had entirely escaped the notice of previous observers. The dissections of the mouth are laboured, but, owing probably to the minuteness of the subject, Mr. Curtis professes his inability to determine whether the organs internal to the *palpi* are mandibles or *maxillæ*: the *palpi* themselves he believes to be biarticulate. The third joint of the *antennæ* seems to be merely excentric, being produced considerably on its inner side, so as to give to the whole organ the appearance of being forked. The curious anterior appendages of the alary trunk are shown, by its separation into the segments of which it is composed, to be attached to the *mesothorax*, and consequently to be truly anterior wings or *elytra*. No mention whatever is made, nor do the figures indicate the existence, of the *Prébalanciers* of M. Latreille: organs which we believe to have been founded on some misconception on the part of that great entomologist.

The species figured is distinguished by the minuteness of the second joint of the *antennæ*, the small size of the second joint of the *palpi*, and the differently formed wings. It appears, from Mr. Dale's information, to have been far from uncommon in Dorsetshire during the spring of 1828, no less than five species of *Andrena* being infested with it, and every specimen taken of one, the *And. barbilabris*, having contained either its *larvæ*, *pupæ*, or *exuviae*. It is active, and even when running up and down a young shoot, has its *elytra* as well as its wings in continual motion, and makes a buzz nearly as loud as that of a *Sesia*, twisting about its rather long tail, which it turns up like a *Staphylinus*. Two bees

confined under a glass, gave birth, if the expression may be allowed, to two *Stylopes*, and immediately before the latter were produced appeared, according to Mr. Dale, quite mad. The confinement together being continued, the bees seemed uneasy, and went up towards the *Stylopes*, but evidently with caution, as if to fight, and, moving their *antennæ* in the direction of their enemies, retreated. Once the bee seemed to make an attempt to seize the *Stylops*, but the latter mounted on the body of its victim, and with its wings still and half erect kept its seat firmly, notwithstanding the efforts which were made to dislodge so annoying a rider. The hole left in the tail of the bee when the *Stylops* escapes is large, and closes up after a time.

Among the twelve *Lepidopterous* genera illustrated, four are proposed as new. These are, 1. *CLISIOCAMPA*, under which are comprehended the *Bombyces processionea*, *Cratægi*, *Neustria*, and *castrensis*; the latter being figured in illustration: 2. *SPERANZA*, a *Phalænoidous* group, remarkably characterized by a protuberance at the base of the upper wings of the males, and distinguished from *Alcis* by the equal size of the two sexes, and the simple hinder *tibiæ*, and from *Bupalus* and *Fidonia* by the want of pectinations towards the apex of the *antennæ*; it is illustrated by a new species, and the *Phalæna limbaria* is referred to it: 3. *MELIA*, a new genus of *Pyalidæ*, offering so remarkable an analogy in habit to *Lithosia* as to have induced Fabricius to unite its typical species, *Melia socia*, with that group; it is regarded by Mr. Curtis as connecting *Galleria* with *Chilo*, a genus recently separated from *Crambus*, and is illustrated by a new species, a second British species, previously undescribed, being also referred to it: 4. *AMPHISA*, a *Tortricidous* group, the type of which is the *Amph. pectinana* recently discovered in Britain, and illustrated by a new species, *Amph. Walkerana*. The genus *Penthophera* is added to our native list by the discovery of a new species, which is here represented; and the species of *Depressaria* figured is also new. A double illustration of *Hipparchia* is given for the purpose of introducing the only two British species of the genus remaining unfigured in English works, the *Hipp. Hero* and *Hipp. Arcanius*, the latter of which is unique as a native production.

Two plates of *Diptera* and one of *Hemiptera* are also included in the volume.

To the preceding notice we may add that Mr. Curtis has recently commenced the publication, in separate sheets, of "*A Guide to an Arrangement of British Insects; being a Catalogue of all the named species hitherto discovered in Great Britain and Ireland.*" Its object is to furnish a compact list for the purpose of being carried in the pocket or transmitted to correspondents, so as to ascertain at one view the insects which are possessed by the student, and those which are desiderata to him. It may also be cut up to form labels for cabinets; and may be made use of as a systematic Index to the British Entomology.

Histoire Naturelle des Mammifères, avec des Figures originales coloriées, dessinées d'après des Animaux vivans. Par MM. GEOFFROY-SAINT-HILAIRE et FRÉDÉRIC CUVIER. Livraison 59^{ème}.

In the present number, nearly the concluding one, of this splendid work, the species of *Mammalia* illustrated are the *Patas à Bandeau blanc*; the *Jacchus Œdipus*, Geoff.; the *Pedetes Capensis*, Ill.; the *Sciurus ferrugineus*, n. s.; the *Ecureuil de la Californie*; and a *Delphinus* designated as No. 4. The text referring to the latter two animals does not accompany the figures; the *Jacchus* and *Pedetes* have been long well known to naturalists; and our notice is therefore limited to the *Patas* and the new Squirrel.

The *Patas à bandeau blanc* appears hitherto to have been noticed by Buffon and Daubenton alone, whose account of it extends no further than to point out the single difference indicated by its name as existing between it and the *Patas à bandeau noir*, which is generally known as the *Simia rubra* of Linnæus. But the former animal differs from that with the black frontlet, not only in this particular but also in several others of at least equal importance. The redness of the fur of its upper surface is less intense, and has more of an orange tinge; this colour does not extend along the outside of the anterior limbs, nor along the *tibiæ*, these parts being grey like the under surface; and each thigh is marked by a whitish spot just beneath the base of the tail. There are no black whiskers on the lips, and, instead of the black band crossing the forehead, a line of black hairs passes obliquely from each temple to unite with the corresponding line of the opposite side upon the middle of the head, at

about an equal distance from the forehead and the *vertex*. Except in these respects the two animals are perfectly similar in appearance, in proportions, and in manners. The differences between them have yet been ascertained on only a single individual of the *Patas à bandeau blanc*, which appears to be extremely rare, and M. F. Cuvier therefore expresses some uncertainty as to their value; nor does he venture to decide, although he looks upon these as equalling in importance the distinctions between the *Callitriche* and other nearly allied *Cercopithec*i, whether they should be regarded as characteristic of a species, or merely as indicative of a strongly marked variety.

The *Sciurus ferrugineus* is a native of the Peninsula of Hindoostan. It somewhat exceeds in size the common Squirrel of Europe, and is subject to some variation in its colours. It is usually of a brilliant golden chesnut, which is rather lighter on the under surface than above; the toes are covered with black hairs, and the whiskers are also black. The ears are not tipped with tufts of hair. The long hairs are most numerous on the back and sides, and clothe the tail completely; and the woolly hairs are in very small quantity in every part of the body. In the individual figured, from a drawing by M. Duvaucel, the long tuft of hairs at the tip of the tail is white; a variety in colour which appears to be merely accidental.

Voyage autour du Monde, pendant les Années 1822, 1823, 1824, et 1825, faite par la corvette La Coquille. Partie Zoologique. Par MM. LESSON et GARNOT. Livraisons i.—xii.

ON the gratitude of zoologists the government of France possesses no slight claims for the liberality with which its influence is exerted in promoting the advancement of the science which they cultivate. Not to mention the Museum and the Menagerie which it has created in Paris, and which have been rendered by its continued support during a series of years almost the centre of zoological knowledge, especial thanks are due for the attention which has been directed under its authority in all the recent voyages of discovery to the acquisition of subjects from the animal kingdom, and of information respecting them. Qualified persons

have been selected, chiefly as surgeons of the vessels employed, and encouragement has been afforded to them, not merely while engaged in the voyage, but also after their return to their native land, where their first care has been to publish, under the auspices of the government, the zoological results of the expedition. Of those obtained from the voyage of M. Freycinet we have lately had occasion to speak : and we have now before us an equally splendid work with the one edited on that occasion by MM. Quoy and Gaimard. The present is devoted to the zoological results of the voyage round the world performed between the years 1822 and 1825, by the ship *La Coquille*, under the command of M. Duperrey. For the collection of these we are indebted to MM. Lesson and Garnot, the surgeons to the expedition, and it is under their superintendence, and especially, we believe, under that of the former, that they are now in course of publication. A somewhat full analysis may be allowed of such a work, which, owing to its extent and the consequent expense of its acquisition, will be confined to a very few libraries.

Passing over entirely the first chapter, which is devoted to general remarks on the Islands of the South Seas, and on the varieties of the human race which inhabit them, (although many curious particulars and much interesting information are contained in it,) we arrive at the general remarks on some *Mammalia*. These occupy the second chapter, and are far from numerous. They are arranged in the order of the places at which the expedition made its short and hurried rests. In the forests of Brasil neither Agoutis nor Armadilloes were met with, although these animals were said by the inhabitants to be abundant ; but the *Cebus Capucinus* was seen in great numbers. The Falkland Islands, affording from the absence of wood but little shelter to terrestrial animals, offer few except the domestic races imported thither by Europeans, which have become naturalized and wild. The horses and pigs are plentiful, and rabbits are abundant ; but the oxen are few in number, suffering continually from the chase of the sailors of the vessels engaged in the South Sea fishery. The *Canis antarcticus* was seen only once. On the western coast of South America few *Mammalia* were seen excepting *Cetacea* and Seals. In Chili the red Coati, some Armadilloes, and a Cat, probably the Jaguarondi, were the only quadrupeds observed, with the exception of the Dog, which is noticed as appearing to form a distinct

species approaching to the Wolf by its size, its long and coarse hair, its straight large ears, and its lengthened muzzle. In Peru the greater number of the Dogs belong to the hairless or Egyptian variety; a species of *Arvicola* was also noticed common; and a *Gerbillus* was said to be frequently met with in the neighbourhood of Piura, of which no specimen could be procured. In the South Sea Islands the only quadrupeds are the Rat, a second large species of *Mus*, the Dog, and the Hog: the latter is of the Siamese breed, and is frequently allowed to run wild in the woods, in which circumstances its tusks become developed. None of the domestic animals attempted to be introduced by the missionaries have succeeded except the Goats, which seem capable of being acclimated with moderate care within the tropics. In the Island of Oualan the *Pteropus Keraudreni*, Temm., and the Norway Rat were observed; and in New Ireland, teeth of the Babyrusa were obtained, as was also the *Phalangista cavifrons*, Temm. In Waigiou, one of the Philippine Islands, the *Phalangista maculata*, Temm., was extremely plentiful, and another Marsupial animal, apparently an undescribed species, of the size of a rat with grey hair and a very slender muzzle, called *Kalubu* by the natives, was obtained, although subsequently lost by shipwreck off the Cape of Good Hope. A large species of Deer has multiplied in Bourou, one of the Moluccas, to a great extent; and the *Pteropus edulis*, the flesh of which is delicate, is met with in abundance in the woods. Here also exists in the interior the remarkable Babyrusa, no specimen of which was procured; but several individuals were subsequently seen in Java. whither they had been brought by the Governor with the intention of sending them to Holland: they died on the voyage, and their skins were not preserved. Hence the museums of Europe were still without specimens of this interesting animal, even up to the period when M. Gaimard despatched, from the voyage in which he is now engaged, a living individual to the Paris Menagerie. In the description given there is little additional information to that derived from Valentyn: the skin is hard, wrinkled, and forming folds, with only a few scattered hairs, and has some resemblance to that of the Tapir. It is very common in the marshes of the interior of Bourou, in the territory of the Alfours. New Guinea furnished the voyagers with a new species of *Sus*: and they once saw a *Galcopithecus* or large *Pteromys*. The Dog of New

Guinea closely resembles that of New Holland, and is identical with that of New Ireland. At Java the *Felis melas*, Pér. and Les., was seen. It is common there, and is said to be ferocious and much dreaded. It is employed in the punishment of slaves guilty of certain crimes; and in state ceremonies, in which the lives of individuals are frequently sacrificed for the gratification of their rulers. In New Zealand only the Hog, the Australian Dog, and the Rat, were observed. At Sidney, the large Kangaroo was seen only in a domesticated state: the *Kangurus Ualabatus*, Less. and Garn., was brought to market in abundance, and sometimes also the *Hypsiprymnus White*, Quoy and Gaim. The *Dasyurus Maugei* was seen in captivity. No opportunity occurred of seeing a living *Ornithorhynchus*, although these animals are said to be still common on the banks of the Fish River at Newcastle, and in Campbell and Macquarrie Rivers. The colonists assured the travellers that the *Ornithorhynchi* are oviparous; and Mr. Murdoch, superintendant of the farm of Emeu-plains, affirmed positively that he had seen the eggs, two in number, and of the size of those of a hen. A living *Echidna Hystrix* was obtained, which had been kept for two months by a convict, who fed it on vegetables. It lived for about three months on board the vessel, refusing equally pulse, insects, meat, and soup, and taking nothing but water, which it lapped greedily. On arriving at the Isle of France, ants and worms were procured for it, but without avail: it, however, took with pleasure the milk of the cocoa-nut. Shortly afterwards it died, having probably been poisoned by some arsenical soup. Its manners in its captivity were particularly noticed by M. Garnot, who describes them with some detail, having evidently taken great interest in watching his curious pet. The animals of the Isle of France are said to have been chiefly imported either from Madagascar or from Java. From the latter came the *Macacus Sinicus*, Geoff.; from the former, the Tenrecs. Two species of *Lemur* were procured, which died on the passage. Such is an outline of the zoological diary of the voyage, so far as relates to the *Mammalia*.

In the third chapter we are presented with descriptions of the new species of *Mammalia* which were collected by the expedition; and of these, with only one or two exceptions, figures are given in the accompanying Atlas of plates. The *Vespertilio Bonariensis*, “auriculis

“brevibus et ovalibus: membranis rubro-nigris; interfemorali villosâ, “infra nudâ: pilis tergi luteis, pruinosisque, abdominis brunneo-luteis, “rostri croceis,” is remarkable for the variety of colours which decorate its fur. Its length is twenty lines, that of its tail fifteen, and extent of its expanded wings eight inches. As in the *Vesp. nigrita*, Gmel., two incisor teeth are deficient in its upper jaw. It differs from the *Vesp. lasiurus*, a North American species, which it seems to represent in nearly the same latitudes in the southern part of the New World, in being larger, in its members being proportionally more developed, in its tail being proportionally one half longer, and in the variety of its colour, that of the New York Bat being uniformly throughout of a bright reddish brown.

The *Otaria molossina* is referred to the genus *Platyrrhynchus* of M. Fréd. Cuvier, and is stated to be synonymous with the Loup marin of Pagès and the Lion de mer of Pernetty. It is thus characterized: “pilis “brunneo-fuscis concoloribus, omnino brevibus; membrorum extremis “nigris: unguibus anterioribus nullis; tribus extensis, necnon robustis, “posterioribus. Segmentis membranaceis et lobatis quinque. Pilis “superioris labri rigidis, lævigatis, transversè complanatis.” The incisors of the upper jaw are divided by a deep groove into two lobes, a character which is assigned by M. F. Cuvier to his *Arctocephali*, but the distinction between these and the *Platyrrhynchi* appears to MM. Lesson and Garnot not to be sufficiently precise; and the mass of characters connect their new species with the latter group. The male *Otaria molossina* has much affinity to the *Otaria jubata*, Desm., but differs not merely in the complete absence of a mane, but also in the proportions of its parts and in size. It is nearly five feet in length, and its circumference at the *axillæ* is nearly three feet. It inhabits the Falkland Islands and the Coast of Chili, as far as Valdivia and La Concepcion. In the former locality it is an object of pursuit to the individuals engaged in the South Sea fishery. The Seals most sought after are stated to be the Sea Lions, *Phoca proboscidea*, Pér., the Maned Seals, *Otaria molossina* and *Ot. jubata*: and the Fur Seals, *Otaria ursina*, Desm. The latter especially has been of late years productive of large profits, but the animals seem now to be becoming scarce. Other species, some of which appear to be yet unknown to science, are also the objects of a considerable commerce.

To the *Phalangista maculata*, Desm., are referred specimens of a Cuscus which the authours had once regarded as the type of a new species, and to which they had given the name of *Cuscus chrysocephalus*. These differ from the individuals previously known by their large size, their almost entirely woolly fur, and their colours. They possess the small additional false molar in each jaw, which is generally indicative of immaturity in the genus to which they belong. But notwithstanding this, which, in conjunction with their size, would appear to indicate that they were the young of a larger animal than the *Cuscus maculatus*, MM. Lesson and Garnot regard them as belonging to that species, of which they consider the specimen figured and described by them to be an individual in its complete developement, and in a fine state of fur. It is placed in a section of the genus *Cuscus*, Lacép., “*Auriculis brevibus, non distinctis, intùs pilosis,*” and is thus characterized, “*Cuscus major, corpore lanuginoso subalbido, suprâ maculis aterrimis sparso. Caudâ prehensili rubrâ, tuberculosâ. Faciei pilis aureo-fulvis: extremitatibus suprâ brunneo-fuscis.*” Its length to the root of the tail is twenty-five inches, and that of the tail twenty inches, eleven inches of the latter being naked: the former dimension, it may be remarked, exceeding in an individual with immature dentary characters by no less than seven inches and a half that of M. Temminck’s largest adult specimen of his *Phalangista maculata*. From the anatomical observations appended we learn that the *sternum* is extremely narrow, being in fact only a slip for the attachment of the cartilages of the ribs: the stomach, which is reniform, occupies the whole of the epigastric region extending a little into the left *hypochondrium*; the pyloric valve is thick and fleshy; the *duodenum* forms a single curve in front of the *vertebræ*; the small intestines, about nine feet and a half in length, join the *rectum* perpendicularly; and the *cæcum* is large, with a vermiform appendage seventeen or eighteen inches in length: the liver is divided into five unequal lobes, two of them being much larger than the others, and notched; the gall-bladder is large, elongated, and placed between the large right lobe and the third in size, by which it is hidden: the spleen is small, elongated, and somewhat triangular: the kidneys are small, and resemble those of the human subject: and the *penis* is placed behind the *scrotum*, its *glans* terminating in a pointed prolongation.

A second species of *Cuscus* belonging to the same section with the

Cusc. maculatus is the *Cuscus macrourus*, n. s., “corpore griseo, pilis “longioribus nigris, et maculis sparsis brunneis. Capite fulvo, gulâ “auriculisque albis. Caudâ robustâ, longiore, cinereâ. Abdomine “albido. Manibus pedibusque nigrescentibus.” In fur it resembles some of the protean varieties of the preceding species, and approaches nearly to the *Phalangista Quoy*, Quoy and Gaim., which MM. Lesson and Garnot are disposed to refer to the *Cuscus maculatus*. But characters fully sufficient to authorise its separation are afforded by its size, two-thirds smaller than that of the species just mentioned, its teeth being at the same time those of an adult animal; by the form of its head, which has no concavity in its profile; and by the developement of its tail compared with its other proportions. The length of its body is twelve inches and a half; that of its tail seventeen inches, of which scarcely seven inches are naked.

To a second section of the genus *Cuscus*, “Auriculis distinctis, intùs “nudis,” is referred a third species described and figured as the *Cuscus albus*, “pilis in universum subalbis; vittâ dorsali longitudinalique fulvâ. “Auribus intùs nudis, extrâ pilosis.” It comprehends the *Phalangista alba* and *rubra*, Geoff., being synonymous with the *Didelphis orientalis*, Linn., and the *Phal. cavifrons*, Temm.

Under the name of *Kangurus Ualabatus*, MM. Lesson and Garnot give a description of the *Kang. bicolor* of the Vélins du Muséum, the *Kang. Brunii*, Desm., remarking that the species indicated by these names is not the *Didelphis Brunii* of Gmelin, with the character of which it by no means accords. The latter animal, for which the name of *Kangurus veterum* is provisionally proposed, was a native of the burning climate of the Moluccas and of the northern part of New Guinea, while the Oualabat, mistaken for it by M. Desmarest, inhabits in great profusion the temperate neighbourhood of Sydney in New South Wales. The character of the species is thus given; “pilis suprâ brunneis, infrâ fulvis. “Caudâ longissimâ, ore, manibus, pedibus, et caudæ parte superiore, “aterrimis. Genis griseis; auricularum pilis inferioribus croceis;” and the description of it, contained in the Mammalogie of M. Desmarest under the name of *Kang. Brunii*, is praised as correct. An animal obtained by the expedition in New Guinea is stated to have been very probably the lost *Didelphis Brunii*, the Pelandoc or Aroe Rabbit. It was called by

the natives at Dorery's Harbour, Podin. Its external characters were those of the Australian Kangaroos, from which it differed in the proportions of its members. Its size was that of the hare; its ears shorter in proportion than in the other Kangaroos; its head rounded, with the muzzle not so slender as that of the Oualabat; its neck also less slender; its anterior limbs more elongated, and stronger; its posterior members shorter and thicker; and its tail one-third shorter. Its fur was of a uniform brown above, passing into grey on the under surface. The animal thus described suddenly disappeared from the vessel at the end of a few weeks, having probably fallen into the sea; so that no further particulars respecting it could be obtained beyond those furnished by the notes taken during its stay on board.

The *Bathyergus Hottentotus*, "minor; pilis suprâ brunneo-griseis concoloribus, subter cinereis: caudâ brevi, planâ, pilis ciliatis ac cinctâ," differs from the *Bath. Capensis*, Desm., by its smaller size, its length being only four inches and a half from the end of the nose to the base of the tail. Its colour affords another ground of distinction, being nearly uniform, lighter on the under surface and on the feet, and exhibiting none of the white spots on the face and head which are remarked in the *Bath. Capensis*. In this latter respect it agrees with the *Bath. Ludwigii* described by Dr. Smith, at page 439 of our fourth volume, with which, notwithstanding its smaller size, and the somewhat different tints of the fur, the animal brought home by MM. Lesson and Garnot has evidently much in common.

A description is given, unaccompanied by a figure, of the *Lepus Magellanicus*, "pilis omnino atro-violaceis, albis passim sparsis: auriculis fuscis, capite brevioribus; maculâ albâ naso, (interstitio narium,) mento, gulæ, frontique." It is of the size and form of the Wild Rabbit; but the Baron Cuvier agrees with M. Lesson in regarding it as a distinct species. Its markings are clear and uniform, and its ears are shorter than the head. It takes up its residence, in small families, in the midst of numerous other Rabbits, whose appearance is perfectly that of the wild European race, with which they agree also in habits.

The *Sus Papuensis*, "corpore gracili; sacco molli sub oculos nullo; dentibus caninis haud aliis longioribus. Setis suprâ brunneo-fuscis, infrâ albis, atro annulatis. Caudâ brevissimâ," differs from

the common species in various particulars, and especially in the disposition and number of its teeth. These in the individual examined were only thirty-six in number, whereas in the *Sus Scrofa* they are forty-four; in the *Sus Papuensis* they may, however, amount to forty, as it seemed probable, from the appearances observed behind the last molar of each jaw, that the rudiments of a sixth molar were contained within the bone. The tusks, as noticed in the specific character, are not longer than the other teeth, and their sockets, although higher, are not directed outwards. The absence of these formidable organs, some resemblance in form, and the shortness of the tail, indicate, according to MM. Lesson and Garnot, the passage from the genus *Sus* to the Peccaries. But there is no organ analogous to the dorsal gland of the latter animals, nor is there any unpleasant odour; each foot also possesses four hoofs. Its length is three feet, and its height nineteen or twenty inches. It is very common in the forests of New Guinea, and furnishes an agreeable aliment.

Numerous *Cetacea* were observed during the voyage, and remarks on these form the subject of the fourth chapter. Many of them were procured for examination, and among these were several species of *Delphinus* altogether new to science, and others hitherto imperfectly understood. Near the Falkland Islands was obtained the *Delphinus bivittatus*, a new species with the upper parts of a deep shining black, and the under parts white, and marked along each side by a broad satiny white stripe, which is interrupted, and becomes broader, opposite to the dorsal fin. In several parts of the South Seas occurred the species described by Lacépède and Desmarest as the *Delph. Peronii*, the *Delph. leucorampus* of the able naturalist whose name is commemorated in its trivial appellation. Owing to the absence of the dorsal fin, this animal is necessarily referable to the genus *Delphinapterus*. It is nearly six feet long, and has thirty-nine teeth on each side of either jaw. The *Delph. albigena* of MM. Quoy and Gaimard, suspected by these authours to be a variety of their *Delph. cruciger*, was also observed in the same seas, and proves, according to MM. Lesson and Garnot, to be a distinct species, to which they give the name of *Delph. superciliosus*. In the Bay of La Concepcion, on the coast of Chili, exists in great numbers another new species, *Delph. lunatus*, of a light fulvous brown above, which gradually melts into the

white of the under surface, and marked in front of the dorsal fin by a brown crescent. Between Java and Borneo was procured another new species, *Delph. Malayanus*, of a uniformly cinereous colour. Several other species which appeared to be new, including the *Delph. minimus*, the *Delph. maculatus*, and the *Delph. leucocephalus*, were observed sufficiently to enable the voyagers briefly to describe them, but no specimens could be obtained, and no figures are consequently given; but representations of the whole of the others enumerated above are contained in the Atlas of Plates.

With the *Mammalia* we terminate for the present our analysis, proposing to resume it when the text shall have proceeded so far as to enable us to give in one article a sufficient view of the whole of the ornithological department of the work. The text now before us embraces only general remarks on the ornithology of the several places at which the expedition rested, and does not descend to particulars as to the new species and forms which were observed. Many of these are extremely interesting, as is evident from the beautiful representations of them contained in the accompanying Atlas.

A Systematic Catalogue of British Insects; being an Attempt to arrange all the hitherto discovered Indigenous Insects in accordance with their natural affinities. By J. F. STEPHENS, F.L. and Z.S., &c. 8vo. pp. xxxiv, 416 and 388.

IN this enumeration of the species of indigenous Insects, Mr. Stephens has furnished us with a condensed view of the results of his entomological labours during nearly twenty years devoted sedulously to their collection and examination. At the period when his enquiries commenced the most extensive lists of British insects in which all the orders were included, were those contained in Berkenhout's Synopsis, in Stewart's Elements of Natural History, in Mr. Donovan's expensively illustrated Natural History of British Insects, and in the indications of Dr. Turton's English edition of the System of Linnæus. In the latter alone did the number of species pointed out as natives of this country approach to even one-fourth of that contained in the present catalogue. We had, how-

ever, on two separate orders, and on one large group, works of superior merit and research. Mr. Marsham had given to us a Species of British *Coleoptera*, the commencement of an *Entomologia Britannica*, which proceeded no farther than its first volume; Mr. Haworth had published about three-fourths of the British species of *Lepidoptera*; and the Rev. W. Kirby had, in his *Monographia Apum Angliæ*, almost exhausted, in every point of view except that of affixing names to his subdivisions, the very extensive subject of the British species of Bees. To these must be added Monographs of a few, and but a very few, genera, chiefly of *Coleoptera*, and a correct idea will be obtained of the total amount about twenty years since of our information as regarded this extensive department of our native Fauna. The *Diptera*, exceeding even the *Lepidoptera* in number of species; the great mass of *Hymenoptera*, at least of equal extent; the *Trichoptera*, even now an almost unknown subject; the *Neuroptera*; the *Hemiptera*, &c.; may be said to have been at that time almost utterly untouched.

But since that period a more active spirit of enquiry has existed, and investigation has been both better and more extensively directed to the acquisition of information on this interesting subject, although until within the last few years but little has been published respecting it. Of the entomologists whose names have been previously mentioned, the Rev. Mr. Kirby and Mr. Haworth have continued the pursuits in which they had already distinguished themselves; the latter has completed his *Lepidoptera Britannica*, and the former has given a monograph of a large genus of *Coleoptera*, and had also prepared an almost equally complete account of the species of the extensive family of *Staphylinidæ*, of which, in geographical distribution, these islands seem, as Mr. Kirby has himself remarked, to be the metropolis. Mr. Spence, the excellent colleague of Mr. Kirby in the *Introduction to Entomology*, has also given a monograph of one interesting group. Two families of *Coleoptera*, almost utterly unknown to entomologists at the period first alluded to, have been admirably illustrated both by the pencil and the pen of Mr. Denny, and the two species known to Marsham have been increased to upwards of forty, partly by his exertions, but principally by those of Dr. Leach. The published labours of the distinguished zoologist just mentioned are limited, as regards our present subject, to a few monographs;

and give but a faint idea of the extent of his investigations, which embraced the whole series of British Insects. Of this ample evidence is afforded by the cabinet which he formed, and which is now in the British Museum, and by his manuscript catalogues and descriptions. Both the one and the others were at all times open to the enquiring student, and from them much assistance was derived by Mr. Samouelle in the preparation of his *Entomologist's Useful Compendium*, a work which first brought the British naturalist acquainted with the views of continental writers as applicable to our native insects. In it was also embodied a list of species indigenous to this country, which far exceeded any that had been previously published. The views of the modern school of entomology, more especially as they relate to the illustration of those subdivisions which are now regarded as genera, have been rendered yet more familiar to us by the *British Entomology* of Mr. Curtis, a work still in progress, but of which six volumes are already completed, embracing figures and descriptions of nearly three hundred genera, and describing or indicating about two thousand species. Of this, and of Mr. Stephens' *Illustrations of British Entomology*, we have already spoken in previous articles in terms of merited praise, and to both these valuable contributions to our native Fauna we trust that we shall frequently hereafter have occasion to advert.

The brief sketch of the progress of British Entomology [which we have thus hastily traced can scarcely be regarded as misplaced in a notice of a work, the publication of which unquestionably forms an epoch in the history of the science among us. Gratifying as it is to witness the rapid strides which are making towards the acquisition of a complete body of information respecting the animal inhabitants of our native country, the feeling partakes somewhat of national pride when we see the most numerous class among them illustrated, as in the present instance, with an accuracy unequalled in any other land. No local list of insects at all comparable with the present in number of species is elsewhere to be found, and there are but few works even of a general nature which exceed it in this respect. It consequently becomes, although professedly local in its object, a work of general interest to entomologists of all countries, to whom it will recommend itself as eminently useful, not merely as an enumeration of species, but also on account of the extent

of its synonymy, which bears the impression of having been throughout collated with the greatest care.

Those who have not attended to the subject, and those also who are not acquainted with the extent of several of the collections at present in London, will be surprised at the announcement that very nearly ten thousand distinct races of insects are known to exist in the British Islands. The mass of these is contained in four orders; upwards of three thousand being Coleopterous; the *Hymenoptera* exceeding two thousand in number; the *Lepidoptera* amounting nearly to two thousand; and the *Diptera* being more than two thousand six hundred. To furnish a complete list of the whole of these is Mr. Stephens' primary object, and this he has effectually done throughout the whole series, with the exception of a few instances among the *Hymenoptera* and *Hemiptera*, where he has contented himself with merely indicating the number of undescribed species in some of the groups, deeming it unnecessary to affix names where the plan of his work did not admit of his pointing out either the distinguishing marks, or even the immediate affinities of the insects. Each species is referred to the genus to which it belongs, the groups of modern authors having been freely and almost universally adopted. In his subdivision Mr. Stephens has gone beyond the writers of France and Germany, in whose works up to the time of his publication he shows himself thoroughly versed, and has named and indicated many new groups in each of the orders; the total number of genera employed by him amounting to fourteen hundred and forty, giving on an average somewhat more than seven species to a genus. In indicating the synonymy of these groups, of the families, and of the orders, the proper plan is pursued of pointing out whether the correspondence between each of them and those of the authors quoted is partial merely, or complete, and whether the author referred to has actually described the group or merely adopted the name of it. The synonymy of the species is also so arranged as to convey much information, showing at a glance whether the insect has been described by the author quoted, or whether the information given by him respecting it is limited to an indication of some particulars relating to its locality, habits, &c.

These useful indications and many others which give to the work a value far beyond that of a mere catalogue, are conveyed by marks usually

employed in printing, and occupying no available space: the mass of information contained in them is therefore imparted to the reader without detracting from the appearance of the pages or adding to the bulk of the volume. Thus we are enabled to judge of the sufficiency of the materials at Mr. Stephens' disposal, by the stops affixed to each species, which are so used as to shew whether the insect has never been seen by the authour, or has been seen by him in cabinets only, or has been seen by him alive, or has been actually captured by him in his entomological excursions. Those species of which he possesses foreign specimens alone have their peculiar mark, and another mark is affixed to such as are not in his own collection: in the latter instance he points out the cabinets in which each is contained, indicating whether he has, or has not, seen them in the places referred to. A mark is employed to distinguish such species as have occurred within the metropolitan district, so as to form within the general list an *Entomologia Londinensis* of much service to the collector whose excursions are limited to the neighbourhood of the capital. Doubtful species are so marked, and are properly placed in immediate succession to those of which they may eventually prove to be merely varieties: and every insect is referred to which has on any authority whatever, been stated to be a native of the British Isles. Among these the doubtful native is distinguished from those exotic insects which can only have found their way into the British list by mistake. The value to the student of such various information need not be insisted on, and in conveying it so fully and in so accessible a form, Mr. Stephens has discharged, with the greatest credit to himself, a task which will secure for him the thanks of every British entomologist.

On the arrangement of the larger groups propounded in the present work we need offer no remarks, its great object, as we conceive it, being the elucidation of species and synonymy, a point of view in which its utility is incontestable.

ART. XXIV. *Proceedings of Learned Societies on subjects connected with Zoology.*

ROYAL SOCIETY.

April 30, 1829.—A paper was read *On the Respiration of Birds*: by Messrs. W. Allen, F.R.S., and W. Hasledine Pepys, F.R.S.

The enquiries of the authours on human respiration, and on that of the Guinea-pig (*Cavia Cobaya*,) of which the details were communicated to the Royal Society in former papers, are here extended to the respiration of Birds. Pigeons were the subjects of these experiments, and the same apparatus was employed as the one used for the Guinea-pig, described in the Philosophical Transactions for 1809.

The object of the first experiment was to ascertain the changes which take place in atmospheric air when breathed by a bird in the most natural manner. For this purpose a Pigeon was placed in a glass vessel containing about sixty-two cubic inches of air, and communicating with two gasometers, one of which supplied from time to time fresh quantities of air, and the other received portions which became vitiated by respiration. The experiment lasted sixty-nine minutes, and was productive of no injury to the bird, except a slight appearance of uneasiness whenever the supply of air was not sufficiently rapid. On examining the air at the end of the experiment, no alteration had taken place either in the total volume of air or the proportion of azote which it contained; the only perceptible change being the substitution of a certain quantity of carbonic acid for an equal volume of oxygen gas, amounting to about half a cubic inch per minute, and being equivalent to the addition of ninety-six grains of carbon in twenty-four hours.

Two experiments were made on the respiration of oxygen gas, obtained from chlorate of potash, and containing in the one case two, and in the other only one, per cent. of azote. Under these circumstances it was found that the volume of the gas was unaltered, and that a similar quantity of oxygen gas had been abstracted, but that a much smaller quantity of carbonic acid had been formed than in the last experiment, the remaining portion being made up by azotic gas which had been given

out from the lungs of the bird, and the volume of which was just equal to that of the oxygen absorbed. The bird was somewhat disturbed during the experiment, but recovered immediately and perfectly on being released from its confinement.

In the fourth experiment, in which a Pigeon was made to respire a mixture of oxygen and hydrogen with a small proportion of azote (the oxygen being in the same proportion as in common air), it was found that there was no loss of oxygen; but that a quantity of hydrogen disappeared, and was replaced by an equal volume of azote. The authours observe, that birds have a quicker circulation of blood than other animals; and also, that they are more sensible to the stimulating effects of oxygen.

LINNEAN SOCIETY.

April 7, 1829.—Mr. Brookes exhibited a living specimen of *Lacerta ocellata* from St. Michael's.

May 25.—At the anniversary meeting, Edward, Lord Stanley, was re-elected *President*; Edward Forster, Esq., *Treasurer*; J. E. Bicheno, Esq., *Secretary*; and R. Taylor, Esq., *Under Secretary*; and Thomas, Marquis of Bath, W. J. Broderip, Esq., R. E. Grant, M. D., J. Lindley, Esq., and N. Wallich, M. D., were elected Members of the Council for the year ensuing.

June 2 & 16. A paper was read *On the Organs of Voice in Birds:* by W. Yarrell, Esq. F. L. S., &c.

The authour, pursuing his enquiries into the structure of the *tracheæ* of birds, describes in the present communication the muscles by the action of which the varied powers of the vocal organs of birds are governed. Their organs of voice consist of four parts: the *glottis*, or superior *larynx*, the tube of the *trachea*, the inferior *larynx*, and the *bronchiæ*. Great differences exist in the relative length of tube; and short *tracheæ* are found to produce shrill notes, as in singing birds, while long ones produce loud and harsher sounds, as in the wading and swimming birds. Strong, broad cartilaginous rings give loud and monotonous voices, and slender rings with large spaces between admit variety of tone. Some of these varieties result from the dilatation and contraction of the mem-

brana tympaniformis, and from the power of altering the length of the *bronchiæ*.

The muscles of the inferior *larynx* vary in number from one pair to five. They are least complex in the *Falconidæ*, some of the *Insessores*, and nearly the whole of the *Rasores*, *Grallatores*, and *Natatores*. In the *Psittacidæ* they are more complex, consisting of three pairs, a number which is not met with in any other family of birds. They attain the extreme number of five in the *Corvi*, starlings, larks, thrushes, finches, warblers, swallows, &c.

ZOOLOGICAL CLUB OF THE LINNEAN SOCIETY.

May 12, 1829.—A paper *On the Organs of Voice in Birds*: by W. Yarrell, Esq., F.L.S., was read by the authour, who subsequently illustrated the subject by references to numerous drawings which he exhibited to the meeting. A discussion ensued in which the Chairman, Mr. Brookes, and Mr. Yarrell took part.

May 26.—Mr. Yarrell exhibited, for the Rev. L. Jenyns, F.L.S., a specimen of *Plecotus barbastellus*, recently taken in Cambridgeshire, and stated that this was the second instance recorded of its occurrence in England.

June 9.—The Rev. W. Kirby exhibited drawings of numerous Insects intended for publication in the forthcoming Fauna of North America. Among them were types of several new genera of *Coleoptera*, and also a new species of *Procerus*, a genus hitherto confined to the old Continent.

A paper *On Luminous Insects*: by R. Chambers, Esq., F.L.S., was read by the authour.

June 23.—Mr. Yarrell exhibited numerous drawings and preparations of the *tracheæ* of Birds, for the purpose of illustrating his paper "On the Organs of Voice," which was read at the meeting of May 12. He explained them to the members present at some length, pointing out the most simple form, and proceeding to the more complex.

November 24.—Mr. Leadbeater exhibited specimens of several species of *Psittacidæ*, which he believed to be new to science. Among

them were two undescribed species of *Platycercus*, Vig. Mr. Leadbeater stated his intention of describing these birds at an early opportunity. He also exhibited a specimen of the *Chlamydosaurus Kingii*, Gray, recently brought from Melville Island.

Mr. Yarrell, on behalf of Mr. Gould, exhibited a specimen of a Warbler, new to the British Fauna, which had been shot at Kilburn, in the month of October.

This specimen was represented to be the *Black Red-tail* of Latham's Synopsis; the *Sylvia Tithys* of the same author's Index Ornithologicus; and the *Bec fin rouge-queue* of M. Temminck. Its more ordinary locality was stated to be the northern part of Europe.

Mr. Yarrell also exhibited a specimen of the *Plectrophanes Lapponica* of Meyer, the *Emberiza calcarata* of Temminck, which had been taken in a net by a bird-catcher near London, late in the autumn. Two specimens of this bird also taken in England formed the subject of a paper by Mr. Selby in the 15th volume of the Transactions of the Linnean Society. The present specimen was the third example recorded of the occurrence of the bird in this country.

Mr. Yarrell, on his own part, exhibited the breast-bones and *tracheæ* of a male and female Wild Swan killed in England, which differed in several points from the anatomical distinctions known to exist in the Hooper, parts of which were also shewn in comparison.

The new species was stated to be nearly one-third less than the Hooper in size, yet the insertion of the *trachea* within the *sternum* was much deeper in the new one, with this remarkable difference, that the convoluted tube of the windpipe, after passing vertically through the whole length of the keel, took then a horizontal direction, and occupied the posterior flattened portion of the *sternum*, a conformation which had never been found by Mr. Yarrell in the oldest male Hoopers. The tube of the *trachea* in the new species was shewn by comparison to be of smaller calibre, and the *bronchiæ* less than half the length of the same parts in the Hooper. Extracts from Hearne's Voyages, and the Philosophical Transactions, were referred to, shewing that both species were known in North America, the smaller sort being more rare than the large.

Mr. Yarrell did not propose any term for this hitherto unnamed spe-

cies, being at present engaged in a correspondence on the subject for the purpose of acquiring additional information.*

Nov. 30.—At a special meeting, held for the purpose of determining as to the expediency of discontinuing the meetings, it was

Resolved unanimously,

That the Meetings of this Club be discontinued.

It was subsequently

Resolved unanimously,

That the Thanks of the Club are due to the Council of the Linnean Society of London for the use of the Society's Rooms, in which the members have passed many happy evenings during the last six years, in promoting in one of its most extensive departments, the object for which the Society was instituted.

The Chairman, N. A. Vigors, Esq., delivered an Address on the progress of Zoology in Great Britain during the past year, and on the present state and prospects of the science, which was ordered to be printed for distribution among the members of the Linnean Society.

* Mr. Yarrell, having since obtained four specimens in addition to those he previously possessed, has more recently entered fully into the differences existing between the Hooper and the new species of Swan noticed above, for which he has proposed, in a Paper read before the Linnean Society, the name of *Cygnus Bewickii*. The most marked distinctions are in the anatomical structure of the *sternum*, and of the *trachea* and its appendages. The external distinctions are indicated by the following specific characters of the allied species, which are given in the paper alluded to:—

Cygnus ferus. Cygn. rostro semicylindrico atro basi lateribusque (his ultra nares) flavis; corpore albo; rectricibus 20; pedibus nigris.

Cygnus Bewickii. Cygn. rostro semicylindrico atro, basi aurantiacâ; corpore albo; rectricibus 18; pedibus nigris.

ART. XXV. *Scientific Notices.*

Notice respecting some Species of Mammalia referred to by Mr. VIGORS and Dr. HORSFIELD in the XIIIth No. of this Journal.

IT is with extreme reluctance that Mr. Vigors and Dr. Horsfield obtrude themselves upon the readers of this Journal, in vindication of a Paper inserted by them in a former number, and which has been commented upon, in a somewhat unusual mode of criticism, by one of the writers in the "*Bulletin des Sciences Naturelles*."

As the professed object of that work, as far at least as relates to Zoology, is to give a succinct account of the various publications in that science, as they issue from the press; and as the usual practice adopted by the contributors to it is to notice the labours of contemporary authors with fidelity, but without note or comment; any deviation from this practice at once challenges observation. When such a deviation from the beaten track is accompanied on the part of the writer by a total misrepresentation of the objects of the work which he undertakes to notice, it seems to originate in motives which demand a still closer inquiry. It is this view of the case which has induced Mr. Vigors and Dr. Horsfield to refer to the criticisms contained in the "*Bulletin*," and thus invest them with an importance which belongs neither to the subject itself, nor to the writer who has forced them into this contest.

In the 13th number of this Journal these gentlemen made some observations upon four species of *Mammalia*, contained in the collection of the Zoological Society. Of these one alone was considered and described by them as a previously unnoticed species. The remaining three were spoken of as either having been considered varieties, or the young of described species, or likely to be so considered. The fact of their being species was held out as problematical, and the attention of naturalists was expressly called to the point for the purpose of ascertaining this fact by the only actual proof which cases of this nature will admit of. In the face, nevertheless, of this explicit statement of their intentions, the writers are misrepresented in the "*Bulletin*," as having described these

animals as decided species. The animals, without having been seen by the critick, are asserted by him to have long been well known and described. And the authours themselves are dismissed with the no very conciliatory imputation of having attempted to palm upon the world “nominal species” and “pretended novelties.”

How far M. Lesson, the avowed writer of this extraordinary comment, has made good his assertions may be collected from the following details.

The first animal referred to by Mr. Vigors and Dr. Horsfield, [Vol. IV, p. 107.] was represented by them as having been hitherto considered one of the varieties of the *Simia Lar* of naturalists, the *Homo Lar* of Linnæus. It was declared to accord with some of the previous descriptions of that species, and more particularly with some of the best representations given of it in plates. They suggested the propriety of separating specifically this reputed variety, which was strongly marked by the hands and feet being white, while the rest of the body was black, from that equally strongly marked variety in which the entire animal was of the latter colour. In this proposed separation they assumed the entirely black variety to be the type of the Linnean species *Lar*; and they suggested the name of *albimana* for the white-handed animal, in case of its being ascertained to be a distinct species.

That they had some grounds for making this provisional separation, and that in so doing they did not lay themselves open to the imputation of wantonly creating nominal species, may be inferred from the fact, that a year subsequently to the publication of their suggestions, M. Geoffroy St. Hilaire proposed the very same separation between these animals;* reversing, however, the mode of naming them, by assuming the white-handed variety as the type of the Linnean *Lar*, and describing the black-handed variety, with a well-meaning and well-merited compliment, under the specifick name of *Rafflesii*.

In cases of this nature where an original observer first points out the specifick difference between reputed varieties of a species, the privilege is usually and naturally accorded him of selecting the variety to which the old name is to be retained. He of course looks to the description of the first imposer of the name, and endeavours to discover which of the

* Cours de l'Hist. Nat. des Mammifères, 7me leçon, p. 33.

varieties best accords with that description. Now in selecting the type of the Linnean *Lar*, Mr. Vigors and Dr. Horsfield considered that the black-handed species agreed, the more accurately of the two, with the description of Linnæus; who, referring to the individual which was the representative of his *Homo Lar*, makes no mention of the white hands, and at the same time quotes the figure of Buffon, in which the white hands are apparent, with a mark of doubt. Subsequent writers also to Linnæus have taken the same view of the subject as Mr. Vigors and Dr. Horsfield; although others of equal authority have assumed a different type. For M. Lesson's satisfaction, it will be sufficient to select from among the former two names which he will not be backward in acknowledging as of ample authority on such points. The first is that of M. Cuvier, who having made the white-handed variety the type of the Linnean *Lar* in the first edition of his "Règne Animal," gives in his second and corrected edition the entirely black species as the type;—the second is that of M. Lesson himself, who in his "Manuel de Mammalogie" expressly describes the *Hylobates Lar* as "entièrement noir." On the whole, the writers in the Zoological Journal cannot but consider that, as the first distinguishers of the two species, they possessed the privilege of selecting the type; and, that, in the exercise of this privilege they added to it the weight of some authority.

Trivial, however, is the end obtained in all such questions of nomenclature:—trivial, unless, as in the present instance, it affords an opportunity of performing an act of courtesy, or paying a tribute to well-merited reputation. And it is with much gratification that Mr. Vigors and Dr. Horsfield take advantage of the opportunity now placed within their reach of according to the well-established merits of M. Geoffroy St. Hilaire the privilege which is theirs only by the humble claim of priority. Their feelings are indeed as much interested in this case, as their sense of what is due to his distinguished character. In the name which that gentleman has imposed upon one of the species, he has made an appeal which cannot be resisted. And it is with no common satisfaction that they yield their own names to those of M. Geoffroy St. Hilaire; their *Hylobates albigularis* merging into his *Hyl. Lar*; and their *Lar* into his *Hyl. Rafflesii*.

But what they thus willingly concede to the merits of this veteran in

science, they utterly deny to the pretensions of M. Lesson. It is strange to observe in the very page where this writer passes his judgment so dogmatically upon the labours of his fellow naturalists, how much he exposes his want of qualifications as a judge. From him as a voyager, and a voyager in the countries where these animals abound, some elucidation might have been expected of their economy, and of their specifick characters, hitherto so little understood. But he has left confusion worse confounded. The very animal which comes next in affinity to the two which are now before us, he has represented as belonging to two totally distinct species. In the "Manuel de Mammalogie" he asserts that the *Hylobates agilis* "is the *Simia Lar* of Sir Raffles."* In the page of the "Bulletin" before us, he pronounces, with equal confidence, that the same animal "is evidently the *Ungka puti* of Sir Raffles."† In this last assertion he happens to be correct. And he owes this chance to his having been set right in the very Paper which he attacks, and by the same authours upon whom he so dogmatically animadverts.—Hinc illæ lacrymæ.—But he has not the grace to acknowledge the correction. He gives his information as emanating from himself. Both his contradictory assertions stand forward with the support of the same dictatorial language and pomp of authority. And the mystified student of the *Quadrumana* hesitates in dismay to which he shall give credit of these rival "Sir Oracles" of the "Manuel" and the "Bulletin."

The second animal of which mention is made by Mr. Vigors and Dr. Horsfield is one which they represented as closely allied to the *Simia nasica* of Linnæus, if not the young of that species. Here again they merely suggested the specifick difference between the animals alluded to, and called the attention of naturalists to the determination of the point. They even went so far as to assign their reasons for bringing into notice so doubtful a point;—"considering," as they aver, "that they will add

* "Gibbon agile, *Hyl. agilis*, F. Cuv. C'est le *Simia Lar* de Sir Raffles." *Man. de Mamm.* p. 31.

† "*L'Ungka puti* de Sir Raffles est évidemment le Wou-wou de M. F. Cuvior, "ou l'*Hyl. agilis*." *Bulletin des Sciences Naturelles*, Mars 1829, p. 454. It is to be borne in mind that Sir Stamford Raffles's *Simia Lar*, or *Ungka etam* of the Malays, is the *Hyl. Rafflesii* of M. Geoff. St. Hilaire, and that his *Ungka puti*, is the true *Hyl. agilis*.

“ as important a fact to science, even if these animals should prove to be the young and adult of the same species, by demonstrating the change that takes place in the animal at different stages of life, as if these differences, according to their own supposition, should be found to be specifick.” p. 110. Notwithstanding the explicitness with which they imagined they had expressed themselves on this point, they find their problematical species enrolled by M. Lesson among their other “ nominal species,” and “ pretended novelties.” With an originality truly edifying when the foregoing passage is taken into consideration, M. Lesson suggests as a new and brilliant idea, proper to himself, the doubt, whether one species may not be *the young of the other* !—But it would be an act of injustice to this writer to conceal the fact that he has brought other weapons to his aid in this “ encounter of wits” besides mere conjecture. M. Lesson, it appears, has added to his other accomplishments a proficiency in the art of logick. Such also we may remember was the case with Aristotle, the first naturalist in every sense of the word, whose works we have on record. In imitation of his great prototype, our modern Stagyrte calls the powers of syllogism to his aid. He argues in form that “ en bonne logique” we may as well create species among the lords of the creation themselves in consequence of the variation in the longitude of their noses, as among the aforesaid monkies. Mr. Vigors and Dr. Horsfield, although thus convicted of breaking the head of Aristotle, have yet paid some attention to his favourite art. They were aware that it would have been as inconsistent with the rules of fair reasoning to institute species among monkies from the length of their noses, as among certain animals, which for obvious reasons shall at present be nameless, from the length of their ears ;—they knew, in fact, that other characters besides these evanescent proportions were necessary to discriminate between the quadrumanous as well as the solipede animal. And they dwelt upon such characters accordingly. “ The claims of our animal to a separate specifick title, rest chiefly upon the nose and *facial angle*”—“ from the difference in the shape of the nose, and *more particularly* from the difference in the *facial angle*.”—“ With so great a disproportion between the *facial angles* of both animals,” &c.—Other minour points of difference are also introduced, although not insisted upon ; but the character above mentioned is one on which the writers in the Journal,

foolishly perhaps, imagined that some stress might be laid, as having been often introduced in the present family as a sufficient foundation even for generick distinction. The words quoted above, although not very difficult, it is hoped, to be understood, have thus been translated by this faithful chronicler of the labours of his contemporaries. "L'espèce que ces auteurs nomment *Nasalis recurvus*,—a pour "tout caractere distinctif d'avoir le nez retroussé." The writers, although they did not study their logick on the same form with M. Lesson, can yet tell him what name in the language of the schools that species of sophism bears, which puts false premises into the mouth of an opponent, and from such alone deduces its conclusion. They can equally suggest the name by which, in the language of honourable men, that mode of animadversion is designated, which misquotes and mutilates the words of a fellow labourer in science, perverts his meaning, suppresses his object, and attempts to produce from such perverted statements an impression to his disadvantage.

The third animal referred to by Mr. Vigors and Dr. Horsfield, and asserted by M. Lesson to be a "pretended novelty," affords, in this judgment of the critick, a striking instance of that flippancy by which writers of a certain class decide upon what they have no means of ascertaining. Those authours had an animal before them which bore a close resemblance to that group of the *Lemuridæ* which includes the flat fronted species allied to *Nycticebus*, Geoff., but having a lengthened tail which the animals of that genus do not possess. It differed also from the group in having four incisor teeth below, and nails more allied to those of the *Monkeys* than of the *Lemurs*. From the strong affinities it exhibited, the writers conjectured that it might belong to the genus *Cheirogaleus* of M. Geoffroy, which had been indicated by M. Commerçon, but not definitely distinguished either by him or succeeding writers. They announced that the animal agreed with the general description of M. Geoffroy: but not having had the opportunity of entering into the details, they promised a more accurate examination and report upon a subject which held out, as they conceived, no little interest. This task the modest critick of the "Bulletin" has taken out of their hands. Without having seen the animal, the only means of coming to a just or indeed any conclusion on such points, or conceding the smallest credit

to those who did see it, he pronounces it at once "to be the *Maki nain* of M. F. Cuvier."—As it happens, he might with about equal justice have pronounced it: "to be an Alligator."

The fact is, as Mr. Vigors and Dr. Horsfield now upon closer inquiry conceive, that they were wrong in their original conjecture. At the time of publishing their observations, they had no clue to the *habitat* of the animal, and they had no means of examining a peculiar form of South America, which had been characterized by M. Cuvier in the "Règne "Animal," under the name of *Nocthora*, and to which they now have reason to suspect their animal belongs. They are indebted to their friend Mr. Bennett for turning their attention to this point, and, from his information they are inclined to conclude that the species is one of those from Brazil, lately characterized by M. Spix. Such is the course of our knowledge on such points. Doubt leads to conjecture; and conjecture terminates sometimes in truth, frequently in error. But even such error is not without its use. In the present instance it has afforded a clue to that beautiful affinity which so intimately connects the two families before us. The doubt has ascertained the point of contact. The animal stands intermediate between the groups. The locality may perhaps afford an artificial line by which it may be restricted to either. But in the comprehensive view of the philosophick inquirer into nature it will equally be a *Lemur* among the *Monkeys*, or a *Monkey* among the *Lemurs*.

The fourth, and to the high satisfaction of the writers, the last, animal described by Mr. Vigors and Dr. Horsfield is a species of *Squirrel*, which they named after the discoverer. This M. Lesson asserts to be the *Sciurus Prevostii* of M. Desmarest. It is true, he admits, that the flanks of the latter animal are yellow, while those of the former are white. But we all know, as he continues to syllogise, how nearly allied white is to yellow:—therefore the two animals are the same:—Q. E. D.—The writers have ever been in the habit of considering that a false or an imperfect description of an animal is, in the eye of the naturalist, no description at all. If M. Desmarest was wrong in ascribing a character to an animal to which it had no claim, his name and description fall to the ground. If he was correct in the characters he ascribed to it, then the two animals are distinct;—distinct, at least, until proof establishes the fact that

the differences arise merely from accidental and varying causes. M. Lesson's logick, which seems to be of the same school as that employed in the before mentioned affair of the noses, will not be admitted as conclusive in such cases. Fact, and fact only, not random assertions, must decide the case. This mode of dictation, founded on such logick, has not yet become the statute law of Zoology. When it is established as such, Mr. Vigors and Dr. Horsfield will make any admission that is asked of them.—They will admit their *Sciurus Rafflesii* to be M. Desmarest's *Sciurus Prevostii*; black to be white; or M. Lesson to be a Linnaeus. Until however that happy epoch dawns upon Natural History, they beg leave to entertain their doubts upon such points.

Mutations of Colour in Sepia and Coryphæna.

ONE of the flattened kind of *Sepia*, brought me by an Indian at Ouhu, interested my attention by the nut-brown spots with which the gelatinous surface was sprinkled, as they continued for some hours after the death of the animal to disappear and re-appear alternately, like a pigment when first thrown upon a mucilaginous medium; as for example, in marbling paper upon a decoction of aniseed. This made me think that the colouring matter floats in a mucous fluid, corresponding in position to the *rete mucosum* of other animals; and by its atomic attraction collected itself into circular spots.

Wherever the skin was touched a number of minute specks immediately followed the impression, occasioned, as I conjectured, by the mucous matter which before concealed the pigments being pressed away, and thus leaving it free to obey the laws just alluded to.

This remark will help us to understand something of the process by which those admired mutations of colour in the dying *Coryphæna* are brought to pass: supposing the death of the animal to alter the condition of the *mucus*, the contained pigment will, of course, alter its arrangement, and admitting the undulatory nature of the propagation of light, all the various alterations of colour may be accounted for by having recourse to the theory of Huygens, as expounded and illustrated by Dr. Young and Mr. Herschel.

J. T. L.

Instinct of Lepidopterous Insects.

Philosophical Society, Portsmouth.

My dear Sir,

It has been asserted by entomologists that the males of the Lepidopterous Insects are guided to the females by a peculiar instinct, so that an unimpregnated female being carried in a wire cage along the hedges and other haunts of this tribe, will attract the males of that species so that they may be easily captured.

I have never had an opportunity of trying this experiment; but the following fact which has lately fallen under my observation leaves me no room to doubt the correctness of the assertion, as it proves the existence and exhibits the operation of this instinct in a very remarkable manner.

Being engaged in adding the British Insects to the Collection of the Portsmouth Philosophical Society, I had procured a variety of *larvæ*, (the insects thus obtained being generally in a better condition than those taken by the net). They in due time passed into the *pupa*, and the first which emerged was a female *Sphinx Convolvuli*. On going into my study in the evening I found it fluttering on the floor: on lifting it up, it ran up my coat, and several times round the collar, before I could place it in safety. I went from thence immediately into my garden to shut some hot-bed lights, where I was occupied about ten minutes; from thence again to my study, where I found that two fine males of the *Sph. Convolvuli* had, whilst in the garden, attached themselves to the collar of my coat, where the female had previously been.

After this, another female of the same species having been produced, three males found their way into my study down the chimney, there being no other mode by which they could obtain entrance, and one of them fell into a vase standing under it where he was captured. A few days after, two females of the *Phalæna Salicis* emerged: on the same evening I saw several of that species fluttering against the window, and on opening it six males rushed in and instantly sought the females.

I state these facts just as they occurred. They are certainly curious, and go to prove that the unimpregnated female emits an odour perceptible to the delicate organs of the males at a great distance, who thus

attracted are stimulated to overcome every obstacle in the way of the fulfilment of the great law of nature. After the female has been impregnated, this effect appears to cease.

Precisely similar circumstances took place with the *Phalæna neustria*, the males presenting themselves at the window.

I am, &c.

JOHN HENRY DAVIES,

Curator Museum,

Portsmouth Phil. Soc.

G. B. Sowerby, Esq., London.

Fauna of the Island of Madeira.

The Rev. R. T. Lowe, B.A., late Travelling Bachelor from the University of Cambridge, to whom we have been indebted for several Papers on the *Mollusca*, is preparing for publication a "Prodromus Faunæ et Floræ Maderensis, or Collections for a Natural History of the Animal and Vegetable Productions of Madeira and the adjacent Islands." In collecting the materials for this work the authour has enjoyed all the opportunities afforded by a lengthened residence in the country, the natural productions of which he has undertaken to illustrate.

THE
ZOOLOGICAL JOURNAL.

February—June, 1830.

ART. XXVI. *Explanation of the Comparative Anatomy of the Thorax in Winged Insects, with a Review of the present state of the Nomenclature of its parts.* By W. S. MAC-LEAY, Esq., A.M., F.L.S., &c.

My dear Vigors,

The enclosed in fact belongs to the Third Part of the "*Horæ Entomologicæ*," entitled "*An Analytical Essay on the Developement of Annulose Forms*;" * but as the receipt of some of the late publications from England makes me sorry that errors should acquire strength by not being

* It has been thought that this Essay is to be confined to the description of the structure of Larvæ. My intention, however, is, that it should embrace the developement of the whole Annulose Structure, whether in the Larva, Pupa, or Imago state. To those friends who have of late urged me to give a second edition of the first volume of the "*Horæ Entomologicæ*," I take the opportunity of saying, that this will probably never be done, at least under the same form;—a form, which, however convenient for the purpose of making known the results of my various investigations in the shape of Essays, is not such as I would choose, were I to state those investigations a second time to the entomological world. For instance, the First Part of the "*Horæ Entomologicæ*," although it led the way to the researches explained in the Second Part, ought hereafter, in fact, to follow them. The form of the work, however, is too convenient to be abandoned by a naturalist whose other occupations will only permit his making, from time to time, detached Essays; and this must be my only apology for intending to continue a work, of which the first volume is in so few hands, and of which a second edition will probably never be published.

counteracted in time, and as you ask me for such a paper, I hope what I now send will answer your purposes.

Yours ever most truly,

W. S. MACLEAY.

Havana, 2nd October, 1829.

I find it impossible to give, according to the present state of the science in England, any satisfactory description of insects, without making some previous observations on their anatomical nomenclature. My object now therefore is to explain to entomologists a few of the principles by which I shall be guided in my future descriptions.

Eight years have elapsed since the second part of the "*Horæ Entomologicæ*" was published. In this work I gave incidentally an outline of the theory of comparative anatomy so far as it related to the subkingdom of *Annulosa*, and as it was known at the time. Since then indeed three works have appeared, all treating of this most difficult subject with more or less philosophical rigour and critical acumen, but all three apparently having very different objects in view.

The first of these in point of patient labour are the very ingenious and detailed memoirs of M. Chabrier on the Anatomy of the Organs of Flight in various Insects, which were published in the "*Mémoires du Muséum d'Histoire Naturelle*." The object of these memoirs is not to give a strictly comparative view of the anatomy, so much as to shew the internal and external structure of the various organs that have an influence on the flight of insects. This is a work therefore rather important for the information it affords as to facts, than for the generalization of them.

Immediately afterwards M. Audouin published in the first volume of the "*Annales des Sciences Naturelles*"* the first part of his "*Recherches Anatomiques sur le Thorax des Animaux Articulés, et celui des Insectes Hexapodes en particulier*," which researches he announced it to be his intention to continue in the same Journal. They had long before been laid on the table of the Institute, indeed previously to the appearance of M. Chabrier's *Mémoires*, and had been most favorably reported on by M. Cuvier as the president of a commission appointed to examine them.†

* Published in 1824.

† See "Rapport fait à l'Académie des Sciences de Paris dans la Séance du

From what I have seen of this work, which for some reason or other has been interrupted,* there is enough to shew that its author possesses one of those generalizing minds which can stamp a value on the most trivial observation by the philosophical manner in which they link it with others so as to form a complete whole. Such persons indeed are said to make natural history too abstruse and difficult, but it will only be so to the indolent; and the holy friars of natural history can continue to amuse themselves with Linnæus, or if they please with Goldsmith, nothing being required of them but to learn not to interfere with others who attempt to know a little more than themselves. M. Audouin's Researches are as strictly those of a naturalist as the *Mémoires* of M. Chabrier are those of a physiologist. Both works are admirable in their way, and must make any person who studies the subject most anxious for their continuation.

The last work in point of date is the third volume of Messrs. Kirby and Spence's Introduction, † a work perhaps not quite so original as those mentioned above, but certainly most creditable to its author,‡ who treats therein of the external anatomy of insects at great length, and gives a tolerably able nomenclature of parts. The merits of my venerable friend's work, however, are unfortunately shaded by an almost total neglect of generalization, and by an obvious ambition to change the

“Lundi 19 Février 1821, par M. Le Baron Cuvier, sur un Ouvrage de M. Victor Audouin ayant pour titre “*Recherches Anatomiques sur le Thorax, &c.*” The several parts of the Thorax are described, figured, and named in this Report, which must of course establish the date of M. Audouin's Nomenclature.

* In expressing myself thus, allowance must be made for the uncertainty and delay with which I obtain works of science in Cuba. It is possible that M. Audouin has followed up his Researches on the Anatomy of the Insect Skeleton without my being aware of it.

† The last two volumes of this useful work were published in 1826. The chapter on Orismology, in the fourth volume, is more particularly valuable, and making allowance for the nomenclature of parts, deserves the special attention of entomological students.

‡ See the Preface to the concluding volumes of the work, from which it appears that we must attribute the labour of the latter volumes in a more especial manner to the learned author of the “*Monographia Apum Angliæ.*”

whole of our received anatomical nomenclature.* Mr. Kirby's object indeed is apparently to distinguish organs instead of tracing their variation; and thus, so far from generalizing, he has even invented new names for the same organs as they occur in different insects.† How far this may be necessary in the present state of our science it is not for me to say: but it is very sure that an elementary work on comparative anatomy ought to reduce the number of terms as much as possible, as well on account of promoting the philosophy of the science as of facilitating a study, the great objection to which now is the multitude of its technical terms. The most serious objection, nevertheless, to Mr. Kirby's nomenclature is the violent change of universally received names of parts without any sufficient reason,‡ nay, often for some fanciful§ or even erroneous cause||. If such innovations are to be sanctioned, all our classical

* M. Audouin only gives names to parts that were not named before. This author is quoted *once* in a note of the Introduction to Entomology, but it is only in order to blame him for a fault of which I cannot understand how he should have been guilty.

† As for instance, where *tegmina* on the authority of Illiger, *elytra*, and *hemelytra*, are assigned as different names to the *alæ superiores* of Insects as they occur in different orders. There was so much inconvenience before with the two words *elytra* and *alæ superiores* to signify the same organs, that it certainly did not require to be doubled. But this extraordinary ambition to burden the science with new words reigns, unfortunately, throughout a work, that is in many other respects highly meritorious.

‡ Thus we have *promusci* substituted for *rostrum*, which, to say the least, is any thing but an improvement.

§ Thus we have *manus* for *tarsus* on the supposed authority of Moses, and a host of similar instances. It is worthy of observation, that if any of the six feet of *Scarabæus alacer* deserve the name of *hands*, it must be the posterior pair of feet, so far as their office is concerned. How different is this from M. Audouin, who in inventing the name *trochantine* for a piece never before named, regrets that he is obliged to use a word taken from human anatomy.

|| Such as *nasus* for *clypeus*. Were the *clypeus* proved to be the organ of scent, there would even still be no necessity for changing an universally received name that gives rise to no erroneous idea; and this is more than can be said for the proposed alteration. There is some reason to imagine that the organs of smelling are in the head, but none whatever for their being in the *clypeus*. In *Musca*, indeed, it may be urged that they are above the *clypeus*,

entomological works will be unintelligible to persons commencing the science; and our worthy author must really have the goodness to print new editions, adapted to his own nomenclature, of all previous entomological books, before he can expect us to adopt some of his terms. For my part I cannot adopt arbitrary changes, and I think I have so far a right to follow my own opinion on this particular head, inasmuch as I have always most strictly adhered to the anatomical nomenclature of others, and in the case of a paper on the Wings of *Diptera* was even induced to defer its publication, in order that Mr. Kirby's work, which was understood to be about to give a complete nomenclature of parts, might not be interfered with, and unnecessary trouble thereby given to the student. The only use of the nomenclature of parts is as an instrument enabling us to understand the structure of the animal with the least possible difficulty; but this its use must cease and confusion never end, if every person is to be privileged to alter received anatomical terms for the mere gratification of his fancy. To change a received generic name without adequate cause is mischievous enough, but how much more so to alter words used in comparative description, and thus to deprive us of the power of intelligibly comparing.

Much of Mr. Kirby's nomenclature is, however, very good: and we can, I think, recognize considerable traces of that admirable tact for observation which distinguished him in his "*Monographia Apum Angliæ.*" He has described several parts not before named, or at least imperfectly designated. When these his names are the first that have been applied

which circumstance will perhaps be scarcely more satisfactory to those who are always hunting for comparisons with the human subject, than if they were placed in the insect's abdomen. The fact is, that nothing whatever has as yet been *proved* on the subject, as the reader of Mr. Kirby's Chapter on the Senses of Insects, in his fourth volume, will most readily perceive; as yet there is nothing but presumption, and it is really proceeding with too great haste to expect us to abandon the use of the word *clypeus*, while the seat of the sense of smelling remains at least *coram judice*. But this is scarcely the place for such discussion, which I shall resume at a proper opportunity. I shall only say, that in any case I see not a shadow of necessity for abandoning the old word *clypeus*.

to the organs they denote, and are compatible moreover with what ought to be our grand object in anatomy, namely, legitimate generalization (and not fanciful comparisons with the human subject), I shall of course have pleasure in adopting them. In some few cases indeed our venerable countryman's nomenclature may be preferred for purposes of concise description to that of M. Audouin, although for the philosophical view of the subject M. Audouin's terms can scarcely with safety be altered, and have moreover the universally acknowledged right of priority. Thus, if I may be permitted by such naturalists as most properly insist on the right of those who give the first name, I would in the description of species prefer the use of Mr. Kirby's terms *prosternum*, *mesosternum* and *metasternum*; although to give a proper understanding of the comparative anatomy of insects, I would for the same parts use M. Audouin's otherwise less convenient terms *sternum of the prothorax*, *sternum of the mesothorax*, and *sternum of the metathorax*. The nature and object of the present paper, however, preclude me from saying more on the subject of the "Introduction to Entomology"; this work being evidently, by its laying so much stress on differences, rather suited to some artificial system than to the study of the natural one, which depends on generalization. I shall therefore commence the present review of the Theory of Comparative Anatomy in Insects by repeating that M. Audouin's Researches have so far the right of priority, and above all of philosophical criticism, as to justify me in pursuing the path he has pointed out. I am not, however, disposed to be a servile follower, and where I differ from him I shall have no hesitation whatever in pointing out the reasons for my dissent.

It will be recollected by the readers of the "*Hore Entomologicæ*" that I was inclined in that work to adopt the theory that every annulose animal* has a tendency to be decapod, or more properly to have five pairs of thoracic appendages answering to the five thoracic segments. I also assigned my reasons for believing that although the typical number of segments in the body of an annulose animal might be fifteen, yet that the most general number of segments in the body ought to be considered as thirteen, the number in caterpillars and other larvæ: and I ventured to hint that all winged insects, I might have said all *Annulosa*, may be resolved into this

* This theory, however, is only partially correct.

last number of segments. I even stated some strong arguments for thinking that the *Ametabola* and *Arachnida* might be reduced to the annulose type of form. Such was the state of the subject when I left it. I now therefore proceed to M. Audouin's general theory of the insect skeleton, which is the same precisely as mine, although, from his taking no notice of my work in the "*Annales des Sciences Naturelles*," I must suppose he never saw it. By a cautious process of induction he says that he has arrived at the following important conclusions, viz.

1st. That the skeleton of annulose animals is formed of a determinate number of parts, which are either distinct or confluent, as may be, but which exist generally in all.

2ndly. That in some cases a part will be diminished, or even will disappear, while in others the same piece will undergo an extraordinary developement.

3rdly. That the developement of one piece exerts an inverse influence on the contiguous pieces, whence arise the principal differences so much relied upon in classification.

With respect to these three results I may observe, that they are in perfect accord with the "*Horæ Entomologicæ*." I had already in that work stated the determinate number of primary segments to which the Vertebral Axis of all annulose animals tended, and as to M. Audouin's second conclusion, it is nothing more than another mode of expressing the maxim of variation as applied to organs. His two leading observations, therefore, that the skeleton of *Crustacea* and *Arachnida* only differs from that of Winged Insects by the mode in which their segments are developed, and that the *Annulosa* generally only differ from each other in the developement of the same parts in each, or in the confluence or separation of these parts, are neither of them new, any more than the reduction of the larva and perfect insect to the same general law of structure. Where we differ is, as to the mode in which this reduction may be made, and I confess, after having bestowed some attention on the subject, that I am inclined now to prefer the explanation given by M. Audouin. Our leading principles are, however, nearly the same, and in fact, as the study of the natural system is founded on the maxim of variation,* so that

* The maxim of variation, as applied to the arrangement of the animal

of Philosophical Comparative Anatomy is founded on the maxim of the various organs undergoing different degrees of developement in different animals.

It is well known that certain *Ametabola*, instead of getting wings, acquire an additional number of segments to their body, but it is not so well understood, that the contiguous class of *Crustacea* have generally a tendency to adopt a typical number* of segments. These typical segments, for example, are all distinct in *Squilla* among *Crustacea*, and are most confluent in the neighbouring class of *Arachnida*. Not only the several segments which compose the head in *Squilla*, become confluent in *Arachnida*, but sometimes the whole head with the body.† But

kingdom, must be carefully distinguished from the mere comparison of organs. The latter is the *Principe des Connexions* of Geoffroy-St.-Hilaire, which many centuries ago Aristotle explained and described under the name of the Arrangement of Organs *κατ'αναλογίαν*. The comparison of animals is one thing, and the comparison of their organs is another. The last is the province of the comparative anatomist, who is not always, as we know, versed in the first, which is the province of the naturalist. The naturalist, on the other hand, cannot compare animals together without some degree of comparison of their organs. If Geoffroy, therefore, arrived at the first idea of his *Principe des Connexions* by inspiration, as he tells us, (*Phil. Anat.* p. 30.), we are certainly justified in believing that Aristotle must also have been inspired before him.

* This number of segments I have stated in the "*Horæ Entomologicæ*," to be fifteen, allowing three for the head, and twelve, as usual, for the body; but there is good reason to believe, as I shall hereafter shew, that even *Crustacea* may be reduced to the ordinary number of primary segments, which is thirteen. The segments of the head, which are sometimes three, but typically four, are therefore of course, only to be considered as secondary.

† Mr. Kirby, from having through life devoted his attention to winged insects, has, in his "Introduction to Entomology," remained, with respect to the *Aptera* of Linnæus, pretty much where the learned Swede left that most heterogeneous group. Like Linnæus, he divides them according to their number of feet, and in one respect, as to the distinction of the head from the thorax, he is even behind Linnæus, who pointed out this distinction, although perhaps in an improper way. It is to be hoped that our indefatigable countryman will take up the study of this important branch of Entomology with his usual energy, and not leave the pages which relate to the *Aptera* of Linnæus so much

I shall take another opportunity of discussing the external structure of the *Arachnida*, which remains as yet quite unknown. I shall merely now state that the *Acaridæ* are those in which the segments of the body are most condensed or confluent, as the *Macrourous Crustacea* are those *Annulosa* which appear in the imago state to offer the greatest regular developement. A *Scolopendra* offers a construction which goes *apparently* beyond the regular type, and thus such *Ametabola* are in zoology *natural monsters*.* The larvæ of winged insects have in general thirteen segments, indeed I know at present of no one exception. A caterpillar, for instance, has a head, three segments for the thorax, and nine for the abdomen. The first three thoracic segments carry feet; the segment immediately following, or the fifth of the thirteen, (which, as I conceive, may in general be accounted to belong to the abdomen of insects,) rarely possesses locomotive appendages,† but the next segment to this, that is the sixth segment (reckoning the head as one), is supplied with them in certain larvæ, such as those of some *Tenthredinidæ*, which have twenty-two feet. The last seven abdominal segments very often one or other carry spurious feet; and on the other hand, the body may be quite vermiform,‡ that is without any feet whatever, as we know from looking at the larvæ of certain *Hymenoptera*, *Coleoptera*, and *Diptera*.

behind the rest of his work. Scarcely a word, for instance, is said respecting the class of *Crustacea*, and yet some account of their forms appears absolutely necessary in an Introduction to Entomology.

* Understanding well that every one of the thirteen primary segments of an insect, when at the perfection of developement, is divisible, as will be shewn in the following pages, into four minor segments, we get fifty-two segments for an insect that is perfectly regularly developed, and this is the maximum number in *Chilognatha*. The *Chilopoda* have only about half this number of segments, owing to their primary segments in general being only about half as much developed as those of the *Iulidæ*.

† In *Crustacea*, however, the fifth segment of the thirteen very commonly carries feet, or locomotive appendages.

‡ In the "*Horæ Entomologicæ*" I followed the three greatest naturalists that England has produced, Ray, Willughby, and Lister, in placing certain *Vermes* among the *Annulosa*. A minute and careful examination of this subject has convinced me of the accuracy of this mode of viewing nature.

From such facts we come to the conclusion that every one of the twelve segments composing the body of a larva, I may say of an annulose animal, can carry instruments of locomotion or can be without feet, but that in caterpillars there are only six true feet, two to each of the three thoracic segments. Supposing true feet to be those of the imago, the last conclusion may also be arrived at by dissecting any caterpillar just when it is about to change to the chrysalis state.

The perfect winged insect in like manner consists of thirteen primary segments, although often, owing to peculiar necessities of individual structure, two or more of these are confluent, as often occurs in the analogous vertebral axis of *Vertebrata*.* It may easily therefore be shewn that the differences which have been pointed out in respect to the number of segments in perfect insects result more often from imperfect study or unpractised examination on the part of the person describing than from any real anomaly in the animal described.† This truth will be evident to any entomologist who takes the trouble of comparing the perfect insect with the pupa and this again with the larva. By means of the pupa we may always learn how the thirteen segments of the larva are disposed of in the perfect insect. Let any large beetle be taken, for instance one of the *Dynastidæ* or *Prionidæ*; at first sight it seems to have no more than eleven segments to the vertebral axis, but on more accurate examination, and particularly on comparing it with the pupa, we discover that in reality it has thirteen, that is, the number of the larva. This comparison must be attended to by all who wish to obtain correct ideas of the structure of an insect; and the error which has vitiated Mr. Kirby's description of the thorax and abdomen, and which has induced him to describe so many differences which do not in reality exist, arises from his not having sufficiently studied the larva, and particularly the pupa state of insects. If my worthy friend however has erred in failing to generalize, my own

* The number of vertebræ, however, in the axis of the *Vertebrata* has a much greater tendency to vary than the number in the vertebral axis of *Annullosa*. So far, as well as in being more complicated, the skeleton of the *Annullosa* is superior to that of the *Vertebrata*.

† I may here give, as an example, my own observation on the abdomen of an *Oryctes*, as mentioned in "*Horæ Entomologicæ*," Vol. 1, p. 412.

generalization of the anatomical structure of the *Annulosa*, as given in the "*Horæ Entomologicæ*,"* was perhaps too much founded on an idea of M. Latreille, and one of my principal objects now is to correct some mistakes which I have detected in what I formerly advanced, although with doubt, upon this very difficult question.

Every annulose animal, even including the *Myriapoda*, whose apparent departure from the normal structure of *Annulosa* I shall elsewhere explain, may be resolved into thirteen primary vertebral segments, which are thus disposed, one for the head,† three for the thorax, and nine for the abdomen. In certain cases, however, one or two of these abdominal segments may be found intimately connected with the thorax, so that the thorax may be said to consist of five segments. It is on this view of the subject that a *Squilla* may be said to consist of thirteen primary segments, that is allowing four secondary ones for the head, five very small primary ones for the thorax, and seven for the abdomen.‡ On this view also a *Scorpion* consists of a true and distinct head with twelve other primary segments. *Galeodes* has the same normal structure, that is, a large head

* See *Horæ Ent.*, Vol. I. p. 412, where I have hinted the possibility of what Mr. Kirby calls the *Alitrunk* being composed of four segments of the larva. The test, however, which I then proposed, has since led me to a very different conclusion.

† The three or four secondary segments of the head can be reduced to one; or, which is the same thing, the head can in all *Annulosa* be shewn to be composed of four segments or regions, when perfectly developed. For the present I shall only refer to the following words of M. Audouin. "L'entothorax n'existe pas seulement dans le thorax; on le retrouve dans la tête, et il devient un moyen assez certain pour démontrer que celle-ci est composée de plusieurs segmens." See *Ann. des Sc. Nat.*, Vol. I. p. 125.

‡ Perhaps, indeed, *Crustacea* may be said to differ from all other perfect *Annulosa*, inasmuch as the first two segments of the abdomen in other *Annulosa* often in this class become thoracic, carry true feet, and leave only seven segments for the true abdomen. As to the head, the truth is, that when fully developed, it is composed of a *tergum* and a *pectus* (here called a *facies* and a *subfacies*), like one of the three primary segments of the thorax. In the head of a *Squilla* we may observe four series in the *facies*, which clearly answer to the *præscutum*, *scutum*, *scutellum*, and *postscutellum* of a *mesothorax*.

and a body consisting of twelve segments. It follows of course that the first pair of feet, as they are called in all octopod *Arachnida*, whether spiders, scorpions or mites, are nothing else than the labial palpi of winged insects.* This is, it is true, a novel mode of viewing *Crustacea* and *Arachnida*, but as it leads to some most curious results, I shall prove its accuracy at a future opportunity, and shew in what the variations from this type really consist. My business at present must be with winged insects, in which the same rule not only holds good but is typical.

Let us observe a *Phasma*, where the female is apterous and the male winged. In many females of this genus we may perceive the rudiments of the wings, and consequently the inspection of a female will point out to us the structure of the male, considering this last as a perfect winged insect. Well then the female *Phasma* shews nine abdominal segments, three thoracic and a head. The females of certain *Blattæ* are apterous, and in the island of Cuba there is a large insect of this genus to be found under stones in woods, whose four wings are formed, but so short and truncated as to render the possessor incapable of flight. Such insects will also prove a winged *Blatta* to be composed of the abovementioned thirteen segments. The same results are derived from the examination of the larvæ and females of *Drilus* and *Lampyris*. It is true that some of the abdominal segments become more or less confluent in certain in-

* A careful study of the very curious and distinct order of *Arachnida*, and in particular of the genera *Mygale*, *Scorpio*, *Phryne*, *Galeodes*, *Gonyleptes*, and *Chelifer*, in a live state, has convinced me that M. Latreille's idea of these insects being supplied with antennæ is correct. Another certain character of the class is to have the labial palpi converted into a pair of feet which are generally of the same form as the six true feet. Mr. Kirby's ingenuity detected (see Int. to Ent. Vol. IV., p. 387.) what are commonly called the first pair of feet in Scorpions and Spiders, to represent the palpi of winged insects; but he appears to consider them as the maxillary palpi, whereas they in reality represent the labial. A still greater mistake, indeed an unaccountable one in a person of his science, has been his not perceiving that the same rule holds good in the *Acaridæ*, and his placing these most evident *Arachnida* with hexapod *Ametabola*, to which they have no earthly relation, unless perhaps it be that of a slight, and a very slight, affinity of transultation. •

sects, particularly of the analogous orders *Hymenoptera* and *Diptera*. But a little study of their structures will point out the nature of such aberrations, and I repeat that the above is the most correct mode of viewing an insect. Even coleopterous *Annulosa*, such as a *Curculio* or *Cerambyx*,* may be reduced to the same law of structure, the posterior abdominal segments of their larvæ being converted more or less into parts of the organs of generation. One of the most beautiful facts that the study of comparative anatomy presents us with, is the delight Nature appears to take in working as it were with a given quantity of material, while she nevertheless produces an infinite variety of forms.

The developement of the various segments of the body of annulose animals forms another consideration, and a most important one. If the developement of each segment be tolerably uniform, we have the great majority of worms and larvæ. If, on the contrary, the developement of the thirteen segments be irregular, we have the majority of perfect insects, *Arachnida*, and *Crustacea*. In general we may add, that if any one of the three principal parts of the body be greatly developed, the general size being given by the full grown larva, then one or both of the remaining parts must be proportionably small in the perfect insect. This indeed clearly amounts to a truism: and therefore, taking the size of the larva as a limit, we cannot be surprised that the head and abdomen of an *Evania*, for instance, are so small when the developement of its thorax is so great.

The object of my present investigation shall be the thorax † of a winged insect. It is here that M. Audouin has particularly distinguished himself

* I have not alluded in the text to Mr. Kirby's tables, given pp. 703 and 704 of his third volume, or to his previous description of the abdomen in insects, because in some cases they are founded on imperfect examination, and in others on that deficiency of generalization which I cannot help thinking the learned author was solicitous should characterize his work.

† Fabricius in his "*Philosophia Entomologica*" has called this part the *truncus*, an expression which implies the whole body without the head and limbs. Being thus objectionable, the term seems never very generally to have come into use; and in fact becomes quite unnecessary if we divide the *thorax* into *prothorax*, *mesothorax*, and *metathorax*. M. Audouin, therefore, has discarded it as useless as well as objectionable. See *Ann. des Sciences Naturelles*, Vol. I. p. 119.

and been most original. He divides the *thorax* into three parts, *prothorax*, *mesothorax* and *metathorax*, and each of these into two external parts (*pectus* and *tergum*) and one internal, the *furca*, and each of the two external parts he divides again into analogous smaller parts, thus :

ANALYSIS OF THE THORAX.

THORAX or TRUNCUS, Fab.	PROTHORAX	TERGUM	{	Præscutum
				Scutum
				Scutellum
				Postscutellum
		PECTUS	{	Sternum
				Episterna
				* * * *
	FURCA called Antefurca	{	Epimera	
	MESOTHORAX	TERGUM	{	Præscutum
				Scutum *
				Scutellum
				Postscutellum
		PECTUS	{	Paraptera
				Sternum
Episterna				
FURCA called Medifurca	{	Epimera		
METATHORAX	TERGUM	{	Præscutum	
			Scutum	
			Scutellum	
			Postscutellum	
	PECTUS	{	Paraptera	
			Sternum	
			Episterna	
FURCA called Postfurca	{	Epimera		

The above is a table of M. Audouin's theory. Now it being well known that the developement of one part or segment exerts an inverse influence on those which are contiguous, it follows that if the prothorax be developed in the perfect insect, then the third segment or mesothorax

* I have reason to suspect that this *scutum* of the *mesothorax* is resolvable into three pieces, when at its maximum of developement, as in certain *Hymenoptera*, such as *Chalcis*, &c. I shall attempt to prove this afterwards.

will be proportionably small, as in *Coleoptera*; and if, on the other hand, the mesothorax be much developed, we have the prothorax small, as in *Hymenoptera* and *Diptera*. From these principles it follows that the mesothorax of a beetle is to be considered as composed of the third segment of the larva evanescent, while the metathorax consists of the fourth segment of the larva developed. But these two segments have each a pair of wings as well as of feet, which shews an exceeding power of developement in the third and fourth segments of a winged insect.

It must not be imagined that the pieces of the thorax mentioned in the above table are all present and distinct in every insect. Pieces of the thorax may disappear by being evanescent, owing to the great developement of the contiguous segments, or by being confluent, or soldered together with the next adjoining pieces.* To know the pieces which are thus lost, it might be thought that on comparing the larva with the perfect insect the position of the stigmata ought to afford some clue, but in truth these are unsafe guides, as it is well known that the situation of the stigmata in the perfect insect varies very generally and considerably from what it was in the larva.

The prothorax of a beetle is not always so complex in its structure as the mesothorax and metathorax, some of the pieces of the tergum being almost always evanescent. The tergum of the prothorax seems most ordinarily in winged insects to consist of half the number of pieces that compose the terga of the mesothorax and metathorax, taking all three at their maximum of developement. In other words, the tergum of the prothorax in general appears to consist of only two pieces. But looking at *Orthopterous* genera, such as *Locusta* or *Gryllus*, or at certain *Annullosa*, where the tergum of the prothorax undergoes its maximum developement, we can discover all its four divisions. In *Coleoptera*, if one or two of the pieces be not evanescent, they are at least all confluent, so as to form one conspicuous segment, which is the *thorax* of Linnæus and Fabricius. In certain genera of this order, however, the typical composition of the tergum of the prothorax is more or less distinct; the only

* The Hymenopterous genus *Cryptocerus* and several other *Ants* will sufficiently shew how the pieces of the thorax may be completely soldered together almost into one mass.

tolerably general rule being that the excessive developement of the tergum exerts an inverse influence on that of the pectus.*

OF THE PROTHORAX.

The *prothorax* of any insect at its maximum of developement consists then of the following pieces, viz. *four tergal*, which, when confluent, form what ought in all future descriptions of *Coleoptera*, according to the principles of MM. Chabrier, Audouin, and Kirby, to be no longer called the *thorax*, but the *prothorax*:† and *six pectoral* pieces, which form by their connexion one piece that may in all future descriptions be called, as by Mr. Kirby, the *antepectus*. The four tergal pieces may be detected in certain *Orthoptera*; and the six pectoral pieces are the *sternum*, the *antefurca*, two *episterna*, and two *epimera*, the four latter being lateral pieces.‡

1. The *sternum of the prothorax* is well known; it is an essential part, rarely if ever evanescent, and is called the *prosternum* by Kirby.

2. The *antefurca* of Kirby, which is by Audouin called the *entothorax of the prothorax*, is also essential but internal. It is described by Kirby, vol. 3. p. 586.

3. The *episterna of the prothorax* are two lateral pieces that are supported by the *prosternum*, and which may be seen well developed in a *Dytiscus*. They, as well as the *epimera*, are confounded by Mr. Kirby with the *prosternum*.§

* Thus the pectus of the prothorax in large *Locustæ* and *Grylli* is very small, owing to the developement of the tergum being at its maximum.

† The student who wishes to learn the structure of the prothorax, must refer to M. Audouin, the analysis given in the "*Introduction to Entomology*" being very far from correct.

‡ The three *sternums* are often found to be more or less confluent with their respective *epimera* and *episterna*. Owing to the developement of the *tergum*, the *pectus* in *Hymenoptera* is exceedingly diminished. But were each of the *sternums* at its maximum of developement, it would also be found to consist of four pieces like a *tergum*. This is the case in *Iulidæ*, and is more or less apparent in other *Annulosa*. For instance, the *pectus* of the *prothorax* in *Squilla* has a *præsternum*, *sternum*, *sternellum*, and *poststernum*.

§ The *pleuræ* of M. Audouin, or *oræ* of Mr. Kirby, appear to be the inflexed

4. The *epimera* of the *prothorax* are not in general so much developed as the *episterna*, but may be known by being often inferiorly situated, and always in some connexion with the *coxæ*. M. Audouin has observed that they often articulate with the *coxæ* by means of a small intervening piece which he calls the *trochantine*. This piece is similar to the *trochanter*, which terminates the *coxa* at its other end.

I may here observe that when the *stigmata* of the *prothorax*, or any other thoracic *stigmata*, are surrounded by a small horny piece, M. Audouin calls this the *peritrema*.*

OF THE MESOTHORAX.

The *mesothorax* of an insect has, when at its maximum of development, four pieces to the *tergum* (which is the *mesothorax* of Kirby) and eight to the *pectus* (which is the *medipectus* of Kirby).

The four superior or tergal pieces of the *mesothorax* are the *præscutum*, *scutum*, *scutellum* and *postscutellum*,† so named according to their order from the head of the insect.

1. The *præscutum* is the anterior, as its name denotes. It is the *prophragma* of Kirby.‡

2. The *scutum* is a very important piece, often greatly developed, and, according to M. Audouin,§ always articulating with the bones of the

or lateral margin of the *prothorax*, where this is terminated by the *episternum* and *epimeron*. “La réunion de l’episternum, du paraptère et de l’epimère constitue les flancs.” The only names that are useful, however, are those which denote the pieces of the thorax; all others only burden the science. It is just as clear, for instance, to talk of the *side* of the *prothorax* as of its *pleura* or *ora*.

* Very possibly the *pnystega* of Kirby is Audouin’s *peritrema* of the *mesothorax*.

† It is on this account that when a *sternum* is at its maximum of development I name its four pieces, *præsternum*, *sternum*, *sternellum*, and *poststernum*.

‡ See Int. to Ent., Tab. 22, fig. 8. h’.

§ I am inclined to differ with M. Audouin on this head, and think that the *scutum* does not directly articulate with the wing, but by the intervention of two lateral pieces, which I would call the *parapsides*. These are in general soldered together with the *scutum*, but in many *Hymenoptera*, such as *Chalcis*, &c., they are particularly distinct.

wing where these exist. It is called the *dorsolum* by Kirby,* having been previously called *dorsum* by Chabrier.

3. The *scutellum* is that part the external appearance of which is commonly so called by entomologists.†

4. The *postscutellum* is a piece almost always completely concealed in the interior of the thorax, sometimes confluent with the inner face of this so as to be confounded with it, and sometimes being free. It is called *frænum* by Mr. Kirby,‡ but this naturalist only knew it in certain orders.

The above four pieces when united form the *tergum of the mesothorax*.

The eight inferior or pectoral pieces of the mesothorax are the *mesosternum*, K., *medifurca*, K., two *episterna*, A., two *epimera*, A., and two *paraptera*, A.; the six latter pieces being lateral and the paraptera often so situated as to appear to belong to the tergum.

1. The *mesosternum* is exactly to the mesothorax what the prosternum is to the prothorax. It is therefore called by Audouin the *sternum* of the mesothorax.§

2. The *medifurca* is well explained by Kirby.|| It is to the mesothorax what the *antefurca* is to the prothorax. Therefore Audouin calls it the *entothorax* of the mesothorax.

3. The *episterna* are two pieces exactly analogous to those of the prothorax, and have in general similar relative positions.

4. The *epimera* are exactly analogous to those of the prothorax, and have likewise similar relative positions.

5. The *paraptera* are two lateral pieces having a relation to the wings. They are usually supported by the episternum, but in general are little developed or are even evanescent. Their situation is always near the wing, of which indeed they more properly form part.¶

* See Int. to Ent. Tab. 22, fig. 8. *i'*. The scutum of the mesothorax in certain Hymenopterous Insects requires further examination than I can give it in this paper, and I shall therefore return to the subject at some future opportunity.

† See Int. to Ent., Tab. 22, fig. 8. *k'*.

‡ See Int. to Ent., Tab. 22, fig. 8. *l'*.

§ See Ann. des Sc. Nat., Tom. 1, pl. 8.

|| See Int. to Ent., Vol. III. p. 587, Tab. 22, fig. 6. M. Cuvier calls it "la pièce en forme d'y grec."

¶ In *Hymenoptera* the *parapteron* is generally above the wing; in *Coleop-*

The above eight pieces form the *pectus* of the mesothorax or *medipectus* of Kirby. It is difficult to ascertain, from his not separating them in his plates, whether the six last mentioned pieces, viz. the episterna, epimera and paraptera, have been clearly distinguished by Kirby; but if they have been so, then perhaps the episterna of the mesothorax will be the peristethia of Kirby and the epimera his scapularia. The *pleuræ* of the mesothorax, so called by Audouin, are the union of the episternum, parapteron and epimeron.

OF THE METATHORAX.

The metathorax of an insect has also, when at its maximum of development, *four pieces to the tergum* and *eight to the pectus*.

The *four superior or tergal pieces of the metathorax* are, as in the mesothorax, the *præscutum*, *scutum*, *scutellum*, and *postscutellum*.

1. The *præscutum* of the metathorax, like that of the mesothorax, is sometimes internal.* In *Hymenoptera*, however, it is a most conspicuous piece with many insects.

2. The *scutum* is sometimes divided into two parts, as in *Dytiscus*, and sometimes connected, as in *Lucanus*.†

3. The *scutellum* is the next piece of the metathorax and is composed of the *postscutellum* and *postfrænum* of Kirby; this naturalist having mistaken the side processes of the scutellum for separate pieces‡ on account of the channel which divides them longitudinally.

tera generally below. It is a piece which “se prolonge quelquefois inférieure-ment le long du bord antérieur de l’episternum, ou bien, devenant libre, passe au devant de l’aile et se place même accidentellement au-dessus.” On this account M. Audouin changed its name from *hypopteron* to *parapteron*. In *Hymenoptera* it may often be said to belong to the *tergum*, and in *Coleoptera* to the *pectus*.

* See *Ann. des Sciences Nat.*, Tom. I, tab. 8. Mr. Kirby calls this piece the *mesophragma* when it occurs in *Coleoptera*; but in *Hymenoptera*, he calls it the *postdorsolum*, as will be seen by comparing his figures.

† See Int. to Ent. tab. 8. This piece in *Coleoptera* is Kirby’s *postdorsolum*; in *Hymenoptera* he does not appear to have detected it.

‡ The *metapnystega* of Kirby may possibly be the same as Audouin’s *peritrema* of the Metathorax.

4. The *postscutellum* of the metathorax corresponds with the metaphragma of Kirby.

The above four pieces form the *tergum*.

The *eight inferior or pectoral pieces of the metathorax* are, as in the mesothorax, the *metasternum*, the *postfurca*, two *episterna*, two *epimera*, and two *paraptera*, the six last being lateral and the *paraptera* very rarely developed, and often so placed as to appear to belong to the tergum.

1. The *metasternum* of Audouin is very different from that of Kirby, the latter being a most heterogeneous composition,* not only often comprising the true metasternum, episterna, and epimera, but sometimes even confounding all these with the trochanter and coxæ of the posterior legs. What this gentleman calls the bifid mucro of the metathorax in *Dytiscus*, is in reality the termination of the two coxæ. The true metasternum therefore must be studied in the beautiful figures of Audouin, as well as the episterna, epimera, and paraptera where they exist.

2. The *postfurca* has been described by me under one of its most remarkable forms, that of the letter Y, and has been figured by Mr. Kirby pl. 22, fig. 5, b†. b†. b†.

3. The *episterna* of the metathorax, which possibly are what Kirby calls *parapleuræ* :

4. The *epimera* :

5. And the *paraptera* : all hold situations in the metathorax analogous to those of the pieces so named in the pectus of the mesothorax. In some orders, however, the paraptera are so situated as to appear to belong to the tergum.

Hence we observe that the thorax of an insect, when greatly developed, is composed of thirty-four pieces, ten to the prothorax, and twelve to the mesothorax and metathorax respectively. Or, if we reckon the four pieces of the tergum, with the sternum and furca of the pectus, to be each divisible into two by the middle longitudinal suture, as in fact they are, the thorax is composed of fifty-two pieces! So complex is the organization of the thorax in winged insects. This, however, I say, is a great deve-

* *Mesostathium* seems, with Mr. Kirby, to be sometimes the name given to the episterna and sometimes to part of the metasternum.

lopement with respect to the number of pieces, for the developement of any one or more of them, in point of size, will occasion the neighbouring ones more or less to diminish, and even to disappear.

The antefurca, medifurca, and postfurca compose one internal whole that Audouin calls the entothorax, and Kirby, following M. Chabrier, the endosternum. The entothorax sometimes extends into the head of *Annulosa* and sometimes into the abdomen. In the thorax it is composed of six pieces, and serves to keep the œsophagus and intestine *in situ*.

Now to apply the foregoing remarks to some particular cases of structure. The difference between a *Trichius* and a *Cetonia*, or between a *Goliathus* of America and a *Goliathus* of Africa, is that in the latter of the two the epimeron of the mesothorax is remarkably developed. The difference between an *Athyreus* and a *Geotrupes* is that the scutellum of the mesothorax is remarkably developed in the latter: but the greatest developement of this piece among *Coleoptera* is in the genus *Macraspis*. The great developement of the prothorax in some *Coleoptera*, as *Gnoma*, and in certain *Orthoptera*, as *Locusta*, occasions the mesothorax to be less developed in proportion. If, as in *Phasma*, the prothorax be small, then the mesothorax is excessively great, and this latter part takes its greatest developement in the *Hymenoptera*, *Trichoptera*, *Lepidoptera*, and *Diptera*. M. Audouin observes, that if an insect (such as a *Carabus*, or as *Coleoptera* in general) be eminently a walker, the pectus of the thorax is most developed; and if another, such as a moth, or *Lepidoptera* in general, be eminently a flier, then the tergum of the thorax is most developed. But this observation must be cautiously adopted; for the tergum of the thorax is excessively developed in some insects eminently walkers, as for instance, a female *Phasma*, which is apterous.

Owing to the great developement of the mesothorax in *Hymenoptera* the prothorax is diminished in size, but not to the degree that Mr. Kirby supposes. I agree most decidedly with MM. Audouin and Bennett* in thinking that the collar belongs to the prothorax, and shall now attempt

* The entomological student ought particularly to refer to what my learned friend, E. T. Bennett, Esq., says on this subject in his excellent Epitome of M. Chabrier's Observations on the Anatomy of the Thorax in Insects, Zool. Journal, Vol. I. p. 392.

to prove it. Mr. Kirby is undoubtedly wrong in imagining it to belong to the mesothorax, but perhaps not so much in urging that this piece is without a representative in *Coleoptera*. It would however be contrary to every rule of generalization to suppose that the *Hymenoptera* could have any piece peculiar to themselves.* Nature, as I before said, works in inferior groups with a given quantity of materials. I have already shewn the tergum of the prothorax to be, at its maximum of development, composed of four pieces. If these four pieces should be nearly equally developed we have a *Locusta*. If the præscutum and scutum should be greatly developed the other two pieces will disappear, and we shall have the generality of *Coleoptera*; while, on the other hand, if the scutellum or postscutellum should be developed considerably, then the other pieces will disappear, and we shall have an Hymenopterous insect.† Now certainly more than one piece exists in the tergum of the prothorax of *Hymenoptera*. For the præscutum and scutum of the prothorax, i.e. the pieces which represent what is vulgarly called the thorax of the *Coleoptera*, do not entirely disappear in *Hymenoptera* as Mr. Kirby says,‡ since on passing the point of a scalpel under the fore legs of a common Wasp, and so breaking off the prothorax with the head, we shall perceive the ring of the prothorax complete, although it is only represented by the ligamentous membrane which connects the two epimera.§ This

* See Int. to Ent. Vol. III. p. 549. This notion is borrowed from Chabrier, who, however, does not go so far as Mr. Kirby, and fancy that it belongs to the mesothorax. His words are, "la pièce supérieure du prothorax ou le "collier."

† As a corollary from this, it follows that the *Coleoptera* which come nearest to the *Hymenoptera*, are those, the præscutum of whose prothorax is most evanescent, and whose scutellum of the same is most developed.

‡ See Int. to Ent. Vol. III. p. 535.

§ There is one insect, however, which makes me rather doubt whether the structure of the Hymenopterous thorax may not be still nearer to that of *Coleoptera* than is stated above. I allude to the *Agaon paradoxum* of Dalman. If this author's figures be correct, then that most singular Hymenopterous Insect has the thorax of a Coleopterous one, the prothorax being exceedingly developed, and the rest of the thorax proportionably small. There is, perhaps, little doubt of Latreille being right in making the *Chalcidæ* come the nearest to the *Strepsiptera*, *Xenos* being almost an Hymenopterous genus.

Mr. Kirby has most correctly observed, as well as that it is the evanescence at last of this small membrane and the junction of the sides of the antepectus, or more accurately speaking, the connection of the epimera of the prothorax, which forms the singular necks of *Xiphydria* and *Fænus*. These two Hymenopterous genera, so far from being nearest to *Coleoptera* in structure of the thorax, are the farthest from them, as they present no vestige of the præscutum and scutum of the prothorax whatever.

Mr. Kirby, with his usual acuteness observes, that there is no mesothoracic præscutum, or as he terms it, no *prophragma* in front of the *collare*, (which, by the way, there ought to be, on the supposition of its belonging to the mesothorax,) but one behind it. This is an incontrovertible argument to shew that the *collare* belongs to the prothorax.* I conceive the *collare* therefore to represent the third piece of the tergum of the prothorax in *Locusta*, which piece is perhaps evanescent in the generality of *Coleoptera*. This view of the matter will satisfactorily explain all the difficulties which have been so ably brought together in the Introduction to Entomology, and the *collare* shall hereafter be always termed by me the *scutellum of the prothorax*.†

But to understand better what precedes, and to have some notion of the construction of an Hymenopterous insect, let us take a *Polistes*.‡

* I know not exactly how Mr. Kirby would argue, and scarcely what he alludes to, when he says that the *collare* is not separated in any way from the mesothorax in a "*Neuter Mutilla*." He forgets that in Apterous *Hymenoptera* all the pieces of the thorax are sometimes soldered together into one mass. His argument drawn from *Xylocopa* proves nothing more than that, in this genus of Bees, the narrow *collare* is excessively developed laterally, as in other *Hymenoptera* it is developed longitudinally.

† According to M. Audouin it is the scutum of the prothorax.

‡ My insect is perhaps the most common Wasp in Cuba, where it builds a nest of 7 or 8 vertical cells, under the eaves of houses, or any place where it may be sheltered from rain. Its nest is composed of the ordinary papyraceous substance, and of the form and size of TAB. VI. fig. XI. It is consequently rather a solitary wasp, rarely more than three perfect insects being seen about a nest. But, on the other hand, in a convenient situation, these little nests may be seen studded together in great frequency. As far as the vague descriptions of Fabricius will allow me to judge I believe it to be

M. Audouin has already most admirably explained the construction of the thorax in *Coleoptera* in his dissections of *Dytiscus*. Let us therefore, I repeat, take a *Polistes*. It will be easily comprehended from what I have said that the tergum of the prothorax will be found exceedingly diminished, and the tergum of the mesothorax, being so much developed, must present all the four pieces of which it ought to consist.

1. OF THE TERGUM OF THE PROTHORAX.

In *Polistes* we observe the *præscutum* and *scutum* to be evanescent; the latter being represented only by a ligamentous membrane.* The *præscutum* possibly is the evanescent portion that passes into the head and forms its upper junction with the thorax.

The *scutellum*, called *collare* † by Kirby, is considerably developed, offering a vestige behind of the *postscutellum*.‡ The *scutellum* may be separated with ease, as in most other Hymenopterous insects from the mesothorax; but as these insects are essentially fliers, this piece of the prothorax is employed to add strength to the mesothorax in its support of the upper wings. In Ants therefore, and other *Hymenoptera* essentially walkers, it comes readily enough off with the fore feet, as it should do.

the *Polistes Billardieri* of his "*Systema Piezatorum*." However this may be, I will describe the thorax of my insect according to the nomenclature here proposed.

PROTHORAX scutello flavo posticè emarginato, lobis mesothoracis scutum amplectentibus, lateribus deflexis subtriangularibus; pectoris flavi sterno posticè obscuro, anticè marginibus lateralibus ferrugineis.

MESOTHORAX scuto subpentagono ferrugineo, scutelloque parallelogramico flavo, sterno ferrugineo margine utrinque flavo, episternis epimeris parapterisque flavis.

METATHORAX præscuto subsemicirculari flavo, scutelli striati flavi margine anteriori canalique longitudinali ferrugineis, postscutello parapterisque flavis, episternis metasternoque ferrugineis, epimeris flavis ad juncturam metasterni ferrugineis.

The whole length of the Insect is nearly $\frac{7}{8}$ of an inch, and of the thorax alone $\frac{3}{8}$.

The above mode of describing the Thorax appears absolutely necessary when species approach very near each other in their colouring and marks, as Wasps, &c.

* Fig. 2 and fig. 3, A. B.

† Fig. 2 and fig. 3, C.

‡ Fig. 2, D.

Mr. Kirby's "most powerful argument" for the collare not belonging to the prothorax is the fact that in *Vespa* and certain other insects, where the mesothorax is excessively developed, there is both a prothorax (meaning thereby a scutum) and a collare.* And so there would be in the prothorax of every winged insect, if perfectly developed, as may be learned from the prothorax of a *Gryllus*, or the study of M. Audouin's observations. Therefore this "powerful argument" cuts the wrong way.

In *Polistes* the scutellum of the prothorax is emarginate, offering a large sinus in the middle, which embraces two sides of the sub-pentagonal scutum of the mesothorax.

2. OF THE TERGUM OF THE MESOTHORAX.

1. The *præscutum* of the mesothorax is the first piece that comes under our notice.† Under the name of prophragma it is mentioned by Kirby as existing in *Hymenoptera*, and so separating, as it ought to do, the collare from the scutum of the mesothorax. It is an internal and vertical piece.‡

2. The *scutum*, whether the collar be apparent or not, is therefore the second piece of the mesothorax.§ It appears externally joined to the collare, the sides of which embrace it. It is, as Mr. Kirby observes, excessively developed in *Hymenoptera*, and forms indeed the most conspicuous piece of the thorax.||

3. The *scutellum* of the mesothorax, the third piece,¶ and also externally conspicuous in our *Polistes*, follows the scutum.** It is the *postdorsum* of M. Chabrier.

* From this remark it would appear that Mr. Kirby is not aware that the prothorax is a compound piece as well as the mesothorax and metathorax.

† Fig. 4 and fig. 5, E.

‡ See Int. to Ent. Vol. III. p. 549.

§ Fig. 4 and fig. 5, F.

|| By looking at some *Hymenoptera*, where this piece is most developed, it would almost seem to be composed of three confluent pieces, the two lateral yet requiring a name. I suspect, however, not having yet dissected a *Chalcis* carefully, that these last pieces are a third pair of paraptera, possibly those belonging to the prothorax, pushed out of their proper place.

¶ Fig. 4 and fig. 5, G.

** On the subject of this piece, Mr. Kirby gives his only citation of M.

4. The *postscutellum* of the mesothorax is a very remarkable piece in *Hymenoptera*, from being in general well developed in point of size. It is an internal and concealed piece, running under the tergum of the metathorax and parallel to the medipectus. It is, I believe, an essential character of this order that the postscutellum shall be separated from the scutellum except by two lateral processes. In *Polistes* the former piece is of a triangular, concave shape, the base of the triangle facing the scutellum and being connected with it at the angles.* Mr. Kirby does not appear to have noticed this important piece, as his *fræna* in *Hymenoptera* appear to be the *paraptera*, so that the *fræna*, according to him, in *Coleoptera* (where it is the true postscutellum,) and his *fræna* in *Hymenoptera*, are totally distinct pieces! Our author has been led into this singular mistake apparently by never having dissected the thorax, and indeed it is rather a delicate operation to separate the metathorax from the mesothorax. The best mode is to make one transverse incision behind the scutellum and another slanting upwards under the middle pair of feet to meet the former, but so as not to communicate with it about the wings. By then breaking off the two pieces we shall have the mesothorax and metathorax properly separated, that is, the upper wings with the mesothorax and the under with the metathorax.

Audouin, and charges him with confounding the scutum of the mesothorax with the scutellum, but to what work of M. Audouin he refers I am not aware. I think there must be some mistake, as the whole theory, as well as observations, of M. Audouin, go to separate them. M. Chabrier, *Mem. du Mus.*, Vol. VIII. p. 61, says of this piece, "Ses bras semblent tendre sans cesse à s'échapper en glissant des pièces entre lesquelles ils sont situés; et l'extrémité de chaque bras est pourvue de languettes internes qui sont tout à fait couvertes par les intégumens."

* It is of the same shape in *Xylocopa*, and has the same kind of insertion. See Chabrier in *Mem. du Mus. d'Hist. Nat.* Vol. VIII. tab. 4, fig. 9, where this piece is admirably figured, and called the *costal*. M. Chabrier is aware that it belongs to the vertebral axis, for he says, "Je crois que ces pièces supérieures du tronc y compris le *costal* peuvent être considérées comme des vertèbres." The manner in which this piece articulates with the arms of the scutellum of the mesothorax, and with the vectiform bone of the wing ought to be studied in the *Mémoires* of MM. Jurine and Chabrier. For a figure of the piece in *Polistes*, see fig. 4, ☉. See also Bennett in *Zool. Journal*, Vol. I. p. 397.

5. The *paraptera* of the mesothorax are two small suborbicular pieces situated immediately above the rudimentary bones of the wing, and being at this point free, are bounded by the base of the wing below and by the scutum of the mesothorax above.*

3. OF THE TERGUM OF THE METATHORAX.

An Hymenopterous Insect, provided as it is with under wings and posterior feet, ought to have the tergum of the metathorax well developed, and accordingly we find its four pieces all distinct.

1. The *præscutum* of the metathorax is in *Polistes* transverse, and in immediate connexion with the scutellum of the mesothorax except at the angles: having, as we have shewn, displaced the postscutellum of the mesothorax, which is only connected with the said scutellum at the angles. The manner in which this curious process takes place can only be completely understood on a dissection of the parts. It is the *postdorsolum* of Kirby, † only that this naturalist makes the posterior point of it correspond with that part in *Coleoptera* which is the centre of the scutellum of the metathorax.‡

2. The *scutum* of the metathorax is in *Polistes* internal and concealed, taking a vertical direction so as to form a *septum*.§ It still, however, preserves the essential character of the part, that of articulating with the wings. Externally indeed there is nothing apparent of it but the margin or edge, which is the line that separates the *præscutum* of the metathorax from the scutellum of the same. Internally however it is more

* Fig. 9, T.

† And *demi-ceinture* of M. Chabrier. See Int. to Ent. pl. ix. fig. 11. t', where, in fact, if Mr. Kirby had been inclined to generalize, it ought to have been called by him the mesophragma. In my drawings of *Polistes* it is fig. 5, H. In some species of *Formicidæ* this piece, as well as the scutum, is evanescent, owing to the great developement of the scutellum of the mesothorax.

‡ It is this mistake which has caused the whole description of the metathorax in Mr. Kirby's work to be so inaccurate.

§ M. Chabrier does not seem to have clearly detected this piece. I have represented it as it occurs in *Polistes*, fig. 6, I, where it is seen from the interior. It is not, however, always of this form in *Hymenoptera*, nor always concealed; for in some genera, as for instance, in *Pepsis*, Fab., it is externally as conspicuous as the *præscutum* of the metathorax.

developed, and preserves much the same form that it has in many *Coleoptera*. In *Polistes* the form somewhat resembles two quadrants, the radii of which are joined together at their respective curves. The external margin of this piece may possibly be what Mr. Kirby calls the *postfrænum* of *Hymenoptera*,* and its internal developement may be perhaps his *mesophragma*; although, to judge from his *mesophragma* as it exists in *Hymenoptera*, he does not seem to have viewed it internally, where he would have found the scutum to be a very essential piece.

3. The *scutellum* of the metathorax comes next after the scutum, to the anterior margin of which it is joined, so as to present the external appearance of immediately following the præscutum, while the scutum takes its vertical direction as a septum. In *Hymenoptera* this in general is obliquely striated, and a very large and conspicuous piece.† As in *Coleoptera*, it often consists of two large convex pannels,‡ joined together by a channel, which however in this order is more or less evanescent. This channel of connexion Mr. Kirby does not notice in his figures of *Hymenoptera*, although, according to his nomenclature, and taking a Coleopterous insect for type, it ought to be his postscutellum. His postscutellum in *Hymenoptera*, however, is little more than the central posterior point of the præscutum of the metathorax, that is, of his *postdorsolum*.§

4. The *postscutellum* of the metathorax in our insect is elevated, subtriangular with the corners rounded off, and having in the middle an elevation of a horse-shoe form, in which are three apertures, the central one being a longitudinal slit, called by Kirby the *trochlea*,|| and through

* What this author calls the postfrænum in *Coleoptera* belongs to an entirely different piece, namely, the scutellum of the metathorax.

† In *Polistes* the metathoracic stigmata (π) are situated at the anterior external angles of this piece, which is represented fig. 5, K.

‡ The two pannels of this piece in *Coleoptera* are called by Mr. Kirby postfræna, and its connecting channel in the same order is his postscutellum.

§ See Int. to Ent., Vol. III., p. 572.

|| I have adopted this nomenclature, although my readers must feel that this story of the pulley depends more on Mr. Kirby's imagination than on any thing in nature. Mr. Kirby seems to think that he is the first who has noticed this curious structure of the metathorax of a wasp. If he refers, however, to M. Chabrier's excellent Memoir, *Mém. du Mus.*, Vol. III., p. 53, he will find the

which passes a ligament which this author calls the *funiculus*, and which serves, as he correctly says, to support the abdomen. The two lateral apertures are false, being formed above by the two horny lobes of the interior of the horse-shoe, and below by the membrane which forms one side of the passage for the intestines from the thorax to the abdomen. The aperture of the thorax which forms this passage is best seen by turning up the metathorax, when it will be observed to be terminated by a lozenge-formed section laterally widest, having the *trochlea* in front, the two sockets for the legs at the sides, and the passage for the intestines in the middle.

5. The *paraptera* are small trapezoidal pieces which intervene between the præscutum of the metathorax and the sockets of the under wings. In general the *paraptera* belong to the *pectus*; but as in our insect they are situated above the wings, I have thought it best to describe them in this place.*

OF THE PECTUS.

The order of *Hymenoptera* is in general so essentially flying that the tergum of the whole thorax undergoes, as we have seen, a very great developement, which of course occasions the pectus to be very little developed as to size, except in Ants and other tribes which are essentially walkers. This part of our investigation therefore will be proportionably difficult, although I think the excellent principles of M. Audouin will enable us to surmount the difficulty.

1. OF THE PECTUS OF THE PROTHORAX.

The pectus is diminished in size, as I have said, owing to the great developement of the mesothorax. But typically it ought to consist of six pieces, viz.

1. The *sternum* of the prothorax in *Polistes* is narrow, and I know no better way of describing its shape than as resembling a sand glass placed on an escutcheon.† According to Mr. Kirby's definition, the

whole matter perfectly explained without the intervention of either wheels or pullies. I have represented the postscutellum of *Polistes* in figures 5 and 7.

* Fig. 5, O.

† Fig. 8, U.

"*prosternum*" is a "longitudinal or other elevation of the antepectus" "between the fore-feet." I conceive therefore that he gives the name of *prosternum* only to that part of the sternum of the prothorax in a *Polistes* which resembles the escutcheon, and that he would call all the rest part of the antepectus.

2. The *antefurca* is considerably developed, the middle process being connected with the sternum and the lateral process with the epimeron; the interval forming part of the acetabula of the fore feet.*

3. The two *episterna* are each very large, and occupy great part of the antepectus. These pieces, together with the epimera, form the antepectus of Kirby, who has not distinguished between them.†

4. The two *epimera* are situated above the antepectus, are smaller than the episterna, on which they rest, and are connected together above by a ligamentous membrane, which is the representative of the horny shield of the prothorax in *Coleoptera*.‡

2. OF THE PECTUS OF THE MESOTHORAX.

1. The *sternum* of the mesothorax is large and broad, occupying the whole front of the medipectus except for a small space at the two upper angles. It is therefore somewhat of a quadrate form.§ The *peristethium* of Kirby in *Hymenoptera* is the fore part of the sternum, this author not dissecting the pieces according to their sutures,|| and therefore confining the name of mesosternum to only that part of the sternum of the mesothorax which is between the legs.

2. The *medifurca* is very beautiful, exactly resembling the Greek letter Y with its arms joined by a cross line.¶

3. The *episterna* of the mesothorax are two sub-triangular pieces, the three sides of which are bounded by the collare or scutellum of the prothorax, the sternum and the epimeron of the mesothorax.** The wings are inserted at one of the angles of these lateral sub-triangular pieces,

* Fig. 8, Z.

† Fig. 8, Γ.

‡ Fig. 8, Δ.

§ Fig. 9, Q.

|| It may be proper, however, to observe, that although the pieces are here confluent, each pectus contains typically four pieces to its sternum.

¶ Fig. 9, Y.

** Fig. 9, S.

which have not been distinguished by Mr. Kirby. Between the episterna and the squamulæ is a small piece called by M. Chabrier the clavicle. It is not, however, the *clavicula* of Mr. Kirby. As however it, like the squamula, does not properly belong to the thorax, being a rudimentary bone of the wing, I shall not say more of it until I come to treat of the Comparative Anatomy of the Wings of Insects in a future paper.*

4. The *epimera* of the mesothorax are two sub-quadrangular pieces. Three of the sides of an epimeron are bounded by the episternum of the mesothorax in front, by the mesosternum below, and by the pectus of the metathorax behind; the upper side being bounded by the rudimentary bones of the wing and by part of that lateral process of the postscutellum of the mesothorax which joins the scutellum of the same. In my drawing of the medipectus I have carefully avoided representing any part of the postscutellum, because it belongs to the tergum. The point of junction, however, with the epimeron is marked.† Mr. Kirby has noticed the epimera when he very correctly states that “in *Vespa* a small sub-triangular piece just below the base of the upper wing is probably “analogous to the *scapularia* in *Coleoptera*,” *scapularia* being apparently his name for the epimera of the mesothorax.

3. OF THE PECTUS OF THE METATHORAX.

This consists of the usual parts, but I cannot here pretend to make Mr. Kirby's nomenclature harmonize with M. Audouin's. I shall therefore describe the parts in the usual way.

1. The *metasternum* is subquadrate, carinated above, and having a small slit below in the middle. The anterior angles are elevated. It is a very conspicuous piece, yet Mr. Kirby denies its existence.‡

2. The *postfurca* is composed of two branches, which run off from a strong base to meet the junction of the metasternum with its episterna.§

3. The *episterna* are two sub-triangular pieces, each situated close

* The first pair of stigmata are situated between the collar and the clavicles of M. Chabrier. See fig. 1, γ .

† Fig. 9, R.

‡ Fig. 5 and 10, P. Also see Int. to Ent., Vol. III., p. 383.

§ Fig. 10, W.

to the stigmata of the scutellum of the metathorax.* Perhaps these are Mr. Kirby's *parapleurae*.

4. The *epimera* are large, connecting the scutellum with the metasternum, and passing from the episternum to the postscutellum.† Mr. Kirby seems only to have noticed these pieces under the peculiar form they adopt in *Tettigonia*, where he calls them *opercula*.‡

Applying the above philosophical nomenclature to certain insects, which have hitherto been considered anomalous, we shall get some remarkable results. Let us take, for instance, *Stylops Melittæ*.§ We find the puzzling appendages to the scutum of the mesothorax to be true elytra, and that consequently the only wings the insect possesses are the under wings, the *paraptera* of which are enormously developed as well as the *epimera* of the metathorax. This insect, in fact, ceases to be so very extraordinary.||

Having now detailed this symmetrical theory of the thorax, I may apprise the reader that my future descriptions shall be adapted to it. M. Jurine, in his valuable paper on the wings of *Hymenoptera*, says their thorax is composed of thirty-six pieces. Considering, however, the clavicle of M. Chabrier and the squamula to belong to the wing, there are only the following pieces according to Audouin, viz.

• Fig. 5 and 10, N.

† Fig. 5 and 10, M.

‡ See "Rapport fait à l'Acad. des Sciences, &c., 19 Février, 1821." p. 7.

§ Having no specimen of the *Stylops* with me, I am here alluding to Mr. Bauer's figure of it in the Linnean Transactions, and allowance ought accordingly to be made for my not here speaking from actual dissection. From M. Jurine's beautiful dissections of *Xenos Vesparum* it appears that the *Strepsiptera* differ from each other considerably in structure.

|| In the same way *Evania* ceases to have its abdomen very singularly situated on this explanation of its anatomy. The scutellum and postscutellum of the metathorax in this genus being confluent, and the postscutellum, nevertheless, excessively developed, the abdomen appears inserted on the back of the insect. It is, however, in its proper place.

Tergum of Prothorax	4
Pectus of Prothorax	6

Tergum of Mesothorax *	4
Paraptera	2
Pectus of Mesothorax	6

Tergum of Metathorax	4
Paraptera	2
Pectus of Metathorax	6

Total . 34

which, if the simple pieces, as sternum, scutellum, &c. be reckoned as composed of two, joined by the medial line, will make 52 pieces composing the thorax.† Of these Mr. Kirby does not describe much more than 20, and yet uses about 40 different words for them in his nomenclature of the parts of the thorax. On the other hand, the nomenclature given in this paper, and which I have borrowed from M. Audouin with

* If I am right as to the separate existence of the lateral pieces of the scutum of the mesothorax, which I call *parapsides*, then, of course, the tergum of the mesothorax is composed of six pieces, four longitudinal, and two lateral. These last two pieces may be occasionally detected separate in the other orders, but in all they are very usually confluent with the scutum of the mesothorax, so as to form one piece with it. Vestiges of the separation, however, occur even in *Polistes*, *Scolia*, &c., and they become perfectly distinct in *Chalcis*, &c., although in the neighbouring genus *Leucospis*, they are completely confluent. Perhaps the *parapsides* are the two pieces which, added to M. Audouin's, complete the number which M. Jurine assigns to the thorax. M. Jurine had studied the subject too deeply not to have had good reasons for giving this number of pieces to the thorax, although, unfortunately, his lamented death prevented him from naming them.

† Considering the sternum at its maximum of development, which I believe it never is in *Hymenoptera*, it will consist of four transverse segments which, when divided by the medial line, will make the whole number of pieces in the thorax mount up to about 72. But I do not believe that ever this whole number of pieces can appear together in any insect, because the development of one will cause one or more of its contiguous ones to disappear.

little variation, not only gives a complete philosophical and harmonious view of the construction of the thorax, but reduces the number of words used to express 52 pieces to 11; surely a most important consideration when it is borne in mind how great an obstacle to the study of natural history is a cumbersome load of anatomical words. I shall always endeavour to proceed on similar principles of symmetry and condensation in my future papers where I may have to investigate the anatomy of the head, wings, abdomen, and legs. In the mean time, if on no other ground than that of priority, I indulge strong hopes that Mr. Kirby will, in a new edition of his useful Introduction, see the advantage of returning to M. Audouin's nomenclature of the parts of the thorax, while Mr. Westwood, or some other of our acute entomologists, will throw light on the structure of our British Insects by subjecting the different genera to the above kind of comparative scrutiny. No greater service can be rendered to entomology, the field of discovery here proposed being as untrodden as it is vast.

GENERAL EXPLANATION OF PLATES V. & VI.

PROTHORAX.	MESOTHORAX.	METATHORAX.
A & B { Præscutum Scutum	E Præscutum <i>internal</i> F Scutum H Parapsides (vestiges of the)	H Præscutum I Scutum
C Scutellum (alias) Collare	G Scutellum	K Scutellum
D Postscutellum <i>internal</i>	⊙ Postscutellum <i>inter- nal</i>	L Postscutellum
Δ Epimeron	R Epimeron	M Epimeron
Γ Episternum	S Episternum	N Episternum
	T Parapteron	O Parapteron
U Sternum	Q Sternum	P Sternum
	α Squamula, <i>Lat.</i>	δ Socket of under wing
	ε Clavicula, <i>Chab.</i>	ζ Funiculus, <i>Kirb.</i>
	γ Stigma	π Stigma
	β Socket of upper wing	μ Trochlea, <i>Kirb.</i>
	V Middle leg	θ Articulation of abdomen
		σ Sockets of posterior thighs
Z Antefurca, <i>Kirb.</i>	Y Medifurca, <i>Kirb.</i>	V Posterior leg
		W Postfurca, <i>Kirb.</i>
		X Part of abdomen

Fig. I. Sketch of a profile view of the Mesothorax and Metathorax of an Hymenopterous Insect.

N.B. The line marked thus $\overline{\cdot\cdot\cdot}$ denotes the division between the Mesothorax and Metathorax.

Fig. II. Outline of the Tergum of an Hymenopterous Insect as seen externally and in a front view.

Fig. III. Tergum of Prothorax in *Polistes Billardieri*, Fab.

* Front view seen a little obliquely.

† Side view.

Fig. IV. Tergum of Mesothorax in *Polistes Billardieri*, Fab.

* Front view, which shews vestiges of the sutures which separate the Parapsides from the Scutum.

† Side view.

Fig. V. Tergum of Metathorax in *Polistes Billardieri*, Fab.

* Front view.

† Side view of the whole of the Metathorax.

Fig. VI. Scutum of Metathorax in the same insect.

Fig. VII. Termination of Metathorax to shew the four different apertures, viz. the Trochlea, the Articulation of the Abdomen, and the Sockets of the two posterior Legs.

Fig. VIII. Pectus of the Prothorax in *Polistes Billardieri*, Fab.

* Front view with parts separated.

† Side view with the parts separated.

Fig. IX. Pectus of the Mesothorax in *Polistes Billardieri*, Fab.

* Front view with the parts separated.

† Side view with the parts separated.

Fig. X. Pectus of the Metathorax in the same insect, front view.

ART. XXVII. *Additional Notice on the Genus Capromys of Desmarest.* By W. S. MACLEAY, Esq., M.A., F.L.S., &c.

IN my Paper on the genus *Capromys* of Desmarest, there are two typographical mistakes; the Spanish name for the troublesome *Pulex*

180 Mr. W. S. MacLeay's *Additional Notes on Capromys*.

penetrans being *Nigua*, and the British West India name for it being the *Chigoe* or *Jigger*. I beg to state also, that I have lately met with Dr. Poeppig's Paper on *Capromys*, printed in the Philadelphia Transactions, by which it appears that this gentleman had forestalled several of my remarks. The perusal of his observations, moreover, makes me think that the animal described by Mr. Say as *Isodon pilorides*, is not the *Mohuy* of Oviedo, but only some variety of the *Capromys Fournieri*, or the *Hutia Congo*. *Isodon pilorides* of Say will therefore be, as Dr. Poeppig thinks, only a synonym of *Cap. Fournieri*, Desm.; and *Capromys prehensilis* will be the true scientific name (as assigned by Dr. Poeppig) of the Mohuy, or *Hutia Carabali*. This matter would doubtless have been cleared up long ago, had the five animals I sent you alive in the Aurora Frigate, Capt. Austin, arrived safe; for you have a ready access to books, that in this out-of-the-way place I can only expect to see by the merest accident.

I doubt much whether the *Hutia Carabali* has a tail so prehensile as Dr. Poeppig describes. I have seen a negro catch one by its long tail, and then swinging it, completely prevent it from being able to turn and bite him. The animal seemed indeed to be helpless when thus suspended by the tail. It is astonishing the force with which these Hutias will cling by their claws to the hollow of a tree. I have seen one, rather than let go his hold, allow a negro who had caught him by the tail to pull it off. Both the *Capromys Fournieri* and *C. prehensilis* are very partial to caterpillars and chrysalids, but I observe they do not care much for saprophagous larvæ, such as those of *Dynastidæ*, &c. They will also eat dried grass or hay. Their favourite food, however, in their native woods, is the bitter wild orange which has fallen to the ground, and so become decomposed. At night, which is their period of activity, they descend to eat these rotten oranges, and any other fruits or seeds that may have fallen. The *Hutias* are so plentiful in some districts of this island, that it is no uncommon thing to maintain the whole of the negroes on an *Ingénio*, or sugar estate, with them as their principal or only animal food.

ART. XXVIII. *On the manner in which the Geometric Spiders construct their Nets.* By JOHN BLACKWALL, Esq., F.L.S., &c.

FEW animals of solitary habits are endowed with more extraordinary instincts than Spiders. The ardent affection for their offspring so strikingly manifested by some species; the exquisite skill displayed by many in fabricating silken cocoons to contain their eggs, and in the construction of their habitations; the highly curious contrivances by means of which others traverse the regions of air, or descend beneath the surface of water; and the various stratagems had recourse to by all in eluding their numerous enemies and in securing their living prey, are eminently calculated to attract the attention and elicit the admiration of every person who has a mind alive to the wonderful physiological phenomena exhibited by the inferior orders of animated beings. But interesting as the general economy of this remarkable tribe of animals is, and well deserving of more minute investigation than has hitherto been bestowed upon it, on the present occasion I purpose to limit my observations to the manner in which several British species of geometric Spiders construct their snares.

By the elegance of their symmetrical structure and their extreme delicacy of texture, the nets of these uneducated geometricians never fail to excite astonishment, even in the most thoughtless observer, and the pen of the natural historian has been frequently employed in describing the singular process by which they are formed. Among the various authors whose works I have consulted, Messrs. Kirby and Spence have given the most circumstantial account of this process in their comprehensive and excellent Introduction to Entomology;* I shall, therefore, avail myself of what these gentlemen have done, without reserve, introducing such particulars in addition as have resulted from my own researches, and attempting to solve a few of those difficulties which they have left without explanation.

The geometric Spiders usually suspend their nets in an oblique or nearly vertical position, fixing them to trees, shrubs, plants, buildings, &c.

* Vol. I., Letter XIII.

in places where the insects they prey upon abound. After selecting a suitable situation for her purpose, the Spider's first operation, in most instances, is to enclose an area, the figure of which appears to be a matter of indifference, with lines of her own spinning. This is effected by proceeding along the objects immediately surrounding the space destined to be occupied by the net, and attaching to several points, by pressing the spinners against them, a line drawn out after her in her transit from one to another. These marginal lines she strengthens with a few additional ones, and finally gives them the requisite degree of tension by applying to them in different directions numerous smaller threads. Having thus completed the foundations of her snare, in the next place she commences to fill up the outline. Fixing a thread to one of the boundary lines, along which she walks, she guides the filament produced in her progress with one of her hind feet, that it may not touch in any part and adhere prematurely; and crossing over to the opposite side, she there attaches it firmly by applying her spinners. To the middle of this diagonal thread, which is to form the centre of the net, she fixes a second, which in like manner she conveys and fastens to another part of the lines encompassing the area. Along this last-formed thread she returns, drawing out another after her, which, as she does not employ any means to keep it distinct, becomes connected with that on which she is advancing, and is ultimately glued by its extremity to the centre of the net. In this manner, but without observing any regularity in the order of her progression, she forms about twenty or thirty radii, composed of double lines, diverging from the centre to the circumference, and giving the net the appearance of a wheel. She then proceeds to the centre, turns herself round, and pulls each radius with her feet to ascertain its strength, breaking such as seem defective and replacing them by others. Her next proceeding is to produce, round the centre of the net, a spiral line extending thence to the circumference, and intersecting the radii, to which she attaches it by pressing her spinners against them. This spiral line, a few of the more central circumvolutions of which are much nearer to each other than are those removed to a greater distance from that point, serves as a temporary scaffolding for the Spider to walk over, and also to keep the radii properly stretched during her succeeding operations. It, together with the radii and marginal lines, is composed of unadhesive silk; but a spiral line has

now to be spun from the circumference around the centre, which may be regarded as constituting the most important part of the snare. It consists of a fine thread closely studded with minute dew-like globules, easily separable from each other by extending the elastic filament on which they are arranged. They are, in fact, globules of viscid gum, as is proved by their adhering to the finger and retaining dust thrown upon the net, while the unadhesive radii and exterior threads remain unsoiled. These viscid threads alone retain the insects which fly into the net, and as they lose their adhesive property by the action of the air, it is requisite that they should be frequently renewed, a process not neglected by the Spider, which evinces a perfect consciousness of its necessity. Placing herself at the circumference of the net, and fastening her viscid thread to the end of one of the radii, the Spider walks up that radius towards the centre, till she comes in contact with the last produced circumvolution of the unadhesive spiral line, along which she passes to the adjoining radius, drawing out the thread in her transit with the claws of the hind leg nearest to the circumference. She then transfers the thread to the claws of the other hind leg, and passing down the radius at which she has just arrived towards the circumference, she places the foot of the hind leg previously employed in drawing out the thread, on that point in the radius to which her filament is to be attached, and bringing the spinners to the spot there makes it secure. The precise place in each radius at which to fix the thread, is always ascertained by the situation of the foot of the hind leg, and this is determined by touching with the feet of those legs nearest the circumference, the marginal line, or, when the structure of the net is further advanced, the last-formed circumvolution of the viscid spiral line. As this last line approaches the several circumvolutions of the unadhesive spiral line, the Spider bites them away, being sensible that they are no longer of any use to her, and this fact explains why they are never seen intermixed with the circumvolutions of the former in finished nets. The viscid spiral line, whose circumvolutions are nearly equidistant, being separated by a space of one or two lines, is thus produced till it extends to the most proximate circumvolutions of the unadhesive spiral line, which occupying the central part of the net are suffered to remain; it is then discontinued, and the Spider making choice of some retired spot in the vicinity, there constructs a cell in which she may con-

ceal herself from observation. From the centre of the net to this retreat she spins a line of communication, composed of several threads united together throughout their entire length, the vibrations of which speedily inform her of the capture of her prey; and here her labours terminate.

Such is the process, with some slight modifications now to be noticed, employed by the geometric Spiders in the formation of their snares. One species generally converts a radius into the line of communication between the net and its retreat, instead of spinning a separate line for that purpose; and this peculiar appropriation, whether the radius be in the plane of the snare, or whether it be withdrawn from that plane, as is frequently the case, imparts an unfinished appearance to the net, as it prevents the spider from giving her viscid line a spiral form, though this is sometimes attempted with a greater or less degree of success. No sooner does the Spider arrive at one of the radii adjacent to that in connection with her cell, than she returns, traversing the frame-work of her snare till she arrives at the adjoining radius on the opposite side, when she again retraces her steps, and thus oscillating between the two, spins a number of curved viscid lines, or arcs of circles, diminishing in length from the circumference of the net towards the centre. Dr. Lister, who has figured and described this species in his *Treatise de Araneis*, fig. X. p. 47-8, was well acquainted with this peculiarity so common in the structure of its snare, but he has fallen into the error of supposing that it occurs invariably, as appears from the following passage cited from his work. “*Rete* “*amplum & elegantissimum tendit: illud autem in eo perpetuum & sin-* “*gulare est, nimirum è radiis unicum maculis utrinque nudari, idque è* “*centro reticuli ad ejus usque circumferentiam; qui ferè ad aliquam in* “*pariete rimulam aut alibi, ubi animal tutò totum diem latet, porrigitur:* “*atque hic radius ei velut scala est, per quem ascendat descendatque.*”

The learned authors of the *Introduction to Entomology*, in treating upon the construction of the nets of geometric Spiders, (for their remarks, though limited to the proceedings of an individual for the convenience of description, seem intended to apply to all,) state that the Spider always leaves a vacant interval round the smallest first spun circles that are nearest the centre, but for what purpose they are unable to conjecture; and that lastly, she bites away the small cotton-like tuft that united all the radii at the centre of the net, and in the circular opening resulting from

this procedure she takes her station and watches for her prey. In this account I recognize the proceedings of one only among several species of geometric Spiders with which I am acquainted. As far as my own observations extend, it never, like the last species, converts a radius into a line of communication with its retreat; and when it occupies the aperture in the centre of its snare, a thread from its spinners is generally connected with the innermost circumvolution of the unadhesive spiral line, by means of which it quickly lowers itself to the ground when suddenly disturbed. But there are other species which rarely, if ever, leave a vacant interval round that portion of the unadhesive spiral line allowed to remain near the centre of the net; neither do they form an opening at the centre, which almost invariably is left entire.

The reason why the viscid spiral line is not continued to the centre of the net is obvious, for by this arrangement the Spider is enabled to superintend her toils without incurring the risk of being entangled in them. The species referred to by Messrs. Kirby and Spence as always leaving a vacant interval round the smallest first spun circles that are nearest the centre of her net, produces fewer of these small circles than any other Spider that has fallen under my notice; consequently, if the viscid line were prolonged till it made a near approximation to them, the unadhesive lines about the centre would be too closely circumscribed, and the Spider would be subjected to great inconvenience.

Hitherto I have supposed the Spider to form her snare in places evidently easy of access to her; but it is not unusual to see nets fixed to objects between which it is quite impossible that a communication can have been established by any process alluded to above; between distant plants, for example, growing in water. "Here then," as the authors of the Introduction to Entomology observe, "a difficulty occurs. How does the Spider contrive to extend her main line, which is often many feet in length, across inaccessible openings of this description?" To this curious fact my attention has long been directed, and I have thoroughly satisfied myself, by observation and experiment, that in such instances Spiders invariably avail themselves of currents of air, by which their lines are sometimes conveyed to a surprising distance.

If the geometric Spiders be placed on twigs set upright in glazed earthen-ware vessels with perpendicular sides, containing a sufficient

quantity of water completely to immerse their bases, the Spiders, thus insulated, use every means in their power to effect an escape; all their efforts, however, uniformly prove unavailing in a still atmosphere; nevertheless, when exposed to a current of air, or when gently blown upon with the breath, they immediately turn the abdomen in the direction of the breeze, and emit from the spinning apparatus some of their liquid gum, which being carried out in a line by the current, becomes connected with some object in the vicinity. This the Spider ascertains by pulling at it with her feet, and drawing it in till it is sufficiently tense, she gums it fast to the twig, and passing along it speedily regains her liberty. Now, that the same means are frequently resorted to by Spiders in their natural haunts, for the purposes of changing their situation and fixing the foundations of their snares, I have repeatedly observed. I am aware that in the Introduction to Entomology an objection has been urged against the explanation of the difficulty here insisted upon. "If," say the learned authors, "the position of the main line be thus determined by "the accidental influence of the wind, we might expect to see these nets "arranged with great irregularity, and crossing each other in every direction; yet it is the fact, that however closely crowded they may be, "they constantly appear to be placed not by accident but design, commonly running parallel with each other at right angles with the points "of support, and never interfering." In favourable weather, it is well known, that the geometric Spiders usually begin to construct their nets soon after the close of day, and as similar processes must be influenced in a like manner by the simultaneous operation of the same cause, the lines of individuals carried out by a current of air till they become attached to some distant object, will be all parallel or nearly so. This regularity, therefore, instead of militating against the opinion maintained above, appears to me to furnish a powerful argument in support of it.

Sometimes the geometric Spiders suspend their nets in places not entirely surrounded by objects to which, in the first instance, they can proceed and attach their boundary lines. In such cases their operations are deserving of attention. After spinning a few radii, which are fixed to several distant points most accessible to her, the Spider fastens a thread to one of them, gluing it to that extremity which is farthest from the centre of her net. Along this radius she walks, drawing out the thread

after her, and guiding it with one of her hind feet, till she reaches its point of union with one of the adjoining radii: on to this radius she steps, and passing along it to the other extremity, there makes fast her thread; by this simple process connecting with marginal lines distant objects between which no direct communication previously existed.

In the formation of their nets Spiders are regulated chiefly by the sense of touch, which they possess in high perfection. This is rendered extremely probable by the general tenor of their proceedings; for example, they ascertain when they have the full complement of radii by approaching the centre of the net, which is their common point of union, and touching each in succession with the feet, supplying deficiencies wherever they are perceived; and I have already remarked, which greatly tends to confirm this opinion, that they generally construct their snares in the night. The fact, however, is established beyond dispute by the following circumstance. I have repeatedly confined Spiders in glass jars placed in situations absolutely impervious to light, and yet during their captivity they have produced perfect nets of admirable workmanship.

Spiders were supposed by Dr. Lister* to be able to retract their threads within the abdomen; and whoever minutely observes the geometricians when fabricating their silken snares, will be almost induced to entertain the same belief. The viscid line produced in the Spider's transit from one radius to another, is sometimes drawn out to a much greater extent than is necessary to connect the two, yet on approaching the point at which it is to be attached, it appears rapidly to re-enter the spinners, till it is reduced to the exact length required. This optical illusion, for such it is, is occasioned by the extreme elasticity of the thread, which may be extended several inches by the application of a slight force, and on its removal will contract into a minute globule of almost inappreciable dimensions. The viscid line alone possesses this property in a remarkable degree, (the radii and marginal lines being almost destitute of it,) by which it is adapted to the frequent and rapid changes in distance that take place among the radii when the net is agitated by winds or other disturbing forces; and by which the insects that fly against it are more completely entangled than they otherwise could be, without

* *De Araneis*, p. 8.

doing extensive injury to the frame-work of the snare. How this viscid line is fabricated is at present unknown. An examination of its structure, and of the apparatus by which it is produced would furnish interesting employment for the microscope.

In order to determine whether objects entangled in their toils are animate or inanimate, the geometric Spiders pull with their feet the radii immediately in connection with that part of the snare in which they are suspended, and suddenly letting go their hold, produce by this means a vibratory motion in the net which seldom fails to excite to action such insects as are ensnared. Guided by the struggles of her prey, the Spider runs along the most contiguous radius to seize her victim, avoiding any contact with the viscid line as much as possible, and drawing out after her a thread attached to one of the lines near the centre of her net, which serves to facilitate her return.

I regret that I am unable to particularize those species of Spiders which have been more especially the objects of the preceding observations and experiments; but so little has been accomplished in this interesting branch of zoology by British faunists since the time of Lister, that hitherto all my attempts to determine some of them have proved ineffectual.

Previously to giving my remarks publicity, I would gladly have availed myself of the labours of our continental neighbours in this department of natural history, but this would have been attended with considerable inconvenience and much delay, and I am well informed that the works of M. Walckenaer, who is regarded as the highest authority on this subject, are out of print, and cannot be procured either in London or Paris.* A book descriptive of British Spiders, if ably conducted, and accompanied with accurately coloured engravings illustrative of species, would, I do not doubt, be very favourably received by the naturalists of this kingdom. That such a publication should still be a desideratum in the country which has produced a Ray, a Lister and a Willughby is a humiliating reflection.

* M. Walckenaer has commenced, in the *Faune Française*, (a work now in progress,) a history of the spiders which inhabit France. This will probably include the greater number of the British species.—Ed.

ART. XXIX. *Observations on a newly-described Species of Swan.* By JOHN BLACKWALL, Esq., F.L.S., &c.

THE London Literary Gazette, published on the 23rd of January, contains the following notice, under the head "Linnean Society," pages 56, 57. "Another interesting communication, from the pen of William Yarrell, Esq., F.L.S., &c., was also read; it was on a new species of Wild Swan, taken in England, and hitherto confounded with the Hooper. The scientific author in this paper observed, that European naturalists had as yet admitted but one Wild Swan in their systematic catalogues; repeated dissections, however, convinced him of the existence of a second species. The new Swan was represented as one-third smaller than the Hooper, but very similar to that well-known bird in its external characters. In their internal structure they were stated to be decidedly different; and the comparative anatomy of both was detailed at some length. A preserved bird of both species, and several prepared parts of each, as well as numerous drawings, were on the table, in illustration of the subject. The various anatomical peculiarities of this new species were considered highly interesting, and the proofs of distinction conclusive."

From an examination of the various specimens of Swans contained in the Manchester Museum, two of which are Whistling Swans, or Hoopers, one in mature and the other in immature plumage, and a third is of the kind so recently described by Mr. Yarrell, I have, for several years past, strongly suspected that there are two distinct species of the genus *Cygnus* which occasionally visit this country. But, notwithstanding the comparatively small size of the last-mentioned bird, its more clumsy figure, and the snowy whiteness of its plumage, which indicates maturity, its general appearance bears so striking a resemblance to that of the Hooper, that I hesitated to announce it as a new species previously to my having made myself acquainted in some measure with its habits and internal organization, no opportunity of investigating which had hitherto presented itself.

My attention has again been directed to this interesting subject, and my former suspicion corroborated, by a remarkable circumstance that

lately occurred in the neighbourhood in which I reside. About half-past eight on the morning of the 10th of December, 1829, a flock of twenty-nine Swans, mistaken by many persons who saw them for wild geese, was flying over the township of Crumpsall, at an elevation not exceeding fifty yards above the surface of the earth. They flew in a line, taking a northerly direction, and their loud calls, for they were very clamorous when on wing, might be heard to a considerable distance. I afterwards learned that they alighted on an extensive reservoir near Middleton, where they were shot at, and an individual had one of its wings so severely injured that it was disabled from accompanying its companions in their retreat.

A short time since I had an opportunity of seeing this bird, which was then living, and resembled the rest of the flock with which it had been associated, and found, as I had anticipated, that it was precisely similar to the small Swan preserved in the Museum at Manchester, which, I should state, was purchased in the fish-market in that town, about five or six years ago.

Twenty-nine of these birds congregated together, without a single Whistling Swan among them, is a fact so decisive of the distinctness of this species, especially when taken in connection with those external characters in which it differs from the Hooper, that I should no longer have deferred to describe it as a new bird to ornithologists, had I not been anticipated by Mr. Yarrell.

Of the habits and manners of this species little could be ascertained from a brief inspection of a wounded individual; I may remark, however, that when on the water, it had somewhat the air and appearance of a Goose, carrying the neck straight and erect, and being almost wholly devoid of that grace and majesty by which the Mute Swan is so advantageously distinguished. It appeared to be a shy and timid bird, and could only be approached near by stratagem, when it intimated its apprehension by uttering its call. It carefully avoided the society of a Mute Swan which was on the same piece of water.

As far as I can form an opinion from the concise abstract of Mr. Yarrell's researches relative to the bird in question, with which this article is introduced, it appears to me that the conclusion at which that gentleman has arrived is deduced principally from anatomical facts. If I am correct

in my surmise, he will, in all probability, regard this communication, which, by the addition of novel and important evidence, tends more completely to establish his views, as forming an interesting supplement to his paper.

ADDITIONAL OBSERVATIONS ON MR. YARRELL'S NEWLY-DESCRIBED
SPECIES OF SWAN.

On the 28th of February, at half-past ten A. M., seventy-three Swans, of the species recently described by W. Yarrell, Esq., as distinct from the Hooper, and named by that distinguished naturalist *Cygnus Bewickii*, were observed flying over Crumpsall in a south-easterly direction, at a considerable elevation. They flew abreast, forming an extensive line, like those seen on the 10th of December, 1829; like them too they were mistaken for wild geese by most persons who saw them with whom I had an opportunity of conversing on the subject, but their superior size, the whiteness of their plumage, their black feet, easily distinguished as they passed overhead, and their reiterated calls, which first directed my attention to them, were so strikingly characteristic, that skilful ornithologists could not be deceived with regard to the genus to which they belonged.

That these birds were not Hoopers may be safely inferred from their great inferiority in point of size. Now the circumstance of the small Swans associating together in large numbers, unaccompanied by Hoopers, the only known species with which they could be confounded by naturalists, and the difference, pointed out by Mr. Yarrell, in their internal structure, are facts which completely establish their specific distinctness.

ART. XXX. *Entomological Notices*. By the late C.
HEINEKEN, M.D., &c.

IN the 1st vol. of the 2nd edition of the "Introduction to Entomology," p. 361, it is stated that the female *Lycosa* "feeds her young until their first moult," and as it struck me that the difficulties of supplying with

food so numerous and minute a progeny would be very great, I was anxious to ascertain the mode in which it would be accomplished. On the 10th August, 1827, a female *Lycosa* of a large, (an inch from mandibles to anus,) and to me new, species, which had long been kept confined for other purposes, hatched a sac of eggs, and was soon completely covered with young. The cage was so constructed that they could leave it and return at all times, but that she could not. She had been, (as before stated,) long accustomed to the confinement and mode of feeding, and from these circumstances, as well as not belonging to the class of web-making Spiders, imprisonment seemed to interfere but little with her natural habits. A fly was put in (the Spider having been fed as usual on the preceding day); I watched until the whole was consumed. Not a young one ever left its station on the mother, or seemed at all interested in what was going forward. 15th. The young have never yet been seen to quit the mother: she has been fed as usual, but in no instance have they participated in the prey, altered their situations, or appeared in the least excited while she was engaged with it. 21st. In every respect the same. 25th (15 days from their birth). The young have quitted the mother and escaped from the cage.

To establish the fact of their having derived no nourishment in any way from the parent during this period, I separated a colony on the 12th and put them in a glass, with nothing more substantial than air to feed upon. On the 24th, a lens could not detect any difference in size and appearance between these and those which had been left with the mother. After this period they began to die, and on the 31st one was seen preying on another. Eventually one only remained, but I believe that many more perished from starvation than by their fellow-prisoners.

If I supposed that the "I have more than once been gratified by a sight of this interesting spectacle," &c. &c., (which concludes Messrs. Kirby and Spence's account of the *Lycosa*,) applied to the mode of feeding the young (of which there is no mention), and not *exclusively* to their "clustering about her," (which is especially noticed,) I should feel bound in common courtesy to speak very diffidently about the opposite result of my experiment, and in common justice to allow every reasonable deduction from it on account of its having been a solitary one, (in consequence of the difficulty of procuring the spider during the breeding

season), and made upon animals in an unnatural state; but as, from the way in which it is given, it looks more like a general assertion than the result of personal observation, I suspect that like many of its class it will prove an erroneous one, and that protection is all for which they stand indebted to the parent.

It appears to me that in Spiders the following gradation is in a great measure followed. viz.

1st. Those which pay no regard to the cocoons when deposited, and desert both them and the web altogether as soon as the number is completed: e. g. *Epeira Cacti*,* or the *Aranca fasciata*, Fab.

2nd. Those which remain in the web, but take no notice of the cocoon after it is deposited: e. g. *Epeira fasciata*, Walck.

3rd. Those which remain near the cocoon until it hatches, but pay no attention to the young: e. g. *Epeira castrensis*,* &c.

4th. Those which sit upon the cocoon: e. g. *Clubiona*, *Salticus*, &c.

5th. Those which carry it under the belly when they move, and afterwards fix it on the web and partly hold it by their fore legs: e. g. *Theridion inflatum*.*

6th. Those which carry it between the mandibles and never quit it until it hatches: e. g. *Pholcus phalangioides*; and

7th. Those which carry it always at the anus, and protect the young for a certain period: e. g. *Lycosa*.

This latter, as far as my observations go, is the extent to which parental affection, as some innocently call it, has carried Spiders; and although a gentleman, in one of the late Numbers of the Zoological Journal, possesses a Baucis and Philemon as exemplars of his "*Loves of the Spiders*," and seems to hint that the time may not be far distant when the "etiam in amoribus sæva" may be proved a gross libel upon the lady, yet I fear that the matron-like qualities of a dry nurse will even then remain "a consummation to be wished for." By the bye, I suspect that although in that instance the dalliance seemed to last a most unreasonable time, yet that she must either, in the quaint phraseology of old White,

* As I have never been able to procure the work of M. Walckenaer, and have no fuller guide to species than Latreille's *Histoire* &c., I have been obliged to give *pro tempore* names, by way of distinction.

have had an overweening stock of "curiosity to satisfy," or that he was somewhat of a novice in the "art of love;" for although I have never succeeded in detecting a pair in the rapturous embrace, yet I have constantly found males dead in the morning which had been introduced into the same cages with females over night. In one instance last summer I found a pair, (*Epeira Cacti*,) on opposite sides of the same web, but within a few inches of each other; after waiting until my patience was exhausted, I removed them into a large jar containing the branch of a plant: in the morning a hind leg was all which the unfortunate swain had left, to "prate of his whereabouts!" About the same time, a male and female *Epeira calophylla*, in separate cells on the same orange leaf, were confined in the same manner; theirs turned out a complete Charlotte and Werter affair; she was dead and he survived her but an hour! However, to be serious. I am aware that being in confinement not one of my experiments on this head is worth any thing. The matter is still *sub judice*, and can only be set at rest by that most useful of all classes of naturalists, the out of door one. From a number of experiments which it would be tiresome and needless to detail, and which are but of very moderate value from ill health having obliged me to make them upon individuals in confinement, it appears, 1st. That all young Spiders can, and that many even in a state of nature probably do, live for the first fortnight without nourishment. 2ndly. That they all combine, and act in unison and harmony for a certain period, whether confined or at large, this law applying even to different species when confined together. 3rdly. That mothers during this period respect the lives, not only of their own progeny, but of that of others. 4thly. That afterwards a *bellum internecinum* without regard to age or relationship is waged; and 5thly. That although the settling of preliminaries may be indefinitely prolonged, yet that the act once accomplished, the truce is *ipso facto* at an end, and "sauve qui peut" is the termination of their amours.

Having opened the "Introduction to Entomology," (a book which it is not always easy to close again) I see that at page 56 of the same volume and edition, the authors, in their enthusiasm to answer the "objections" to Entomology, have rather unwittingly armed against themselves a

champion, who, although in himself a host, never dreamt, I suspect, of buckling on his armour in so weak a cause. They (Messrs. Kirby and Spence) say, "But this inference that insects are not indued with the same sense of pain as the higher orders of animals, is reduced to certainty when we attend to the facts which insects every day present to us, proving that the very converse of our great poet's conclusion,

——— "the poor beetle that we tread upon
" In corporal sufferance finds a pang as great
" As when a giant dies,"

"must be regarded as nearer the truth." Now, under correction, "our great poet" never for a moment intended to conclude, or to lead others to the conclusion, that insects are indued with as high a sense of pain as men. He spoke exclusively of the physical, or, to use his own word, "corporal" pain of dying. He said, though in other words, "it is evident to your senses that the corporal pain is little or nothing to a crushed insect; it would be no greater to a giant as suddenly annihilated; therefore it is trifling in both cases, and all the extra suffering (the only real suffering in fact) of the man is mental." His authority might therefore with propriety be used to prove that physical pain was much less severe in all animals than is generally supposed, (and which I have no doubt that it is,) but after reading the former part of the quotation,

——— ——— "Dar'st thou die?
" The pain of death is most in apprehension,
" And the poor beetle," &c. &c.*

* There are few instances of a more complete perversion of the meaning by a partial quotation of a sentence, than occurs in this passage of Shakspeare. The object of the fair pleader being to encourage her brother steadfastly to encounter death, would scarcely have been forwarded by depicting that consummation as attended with great corporal sufferance. Yet such is the effect of the omission of the context. It is curious too to observe the zeal with which entomologists especially have again and again defended themselves against an assertion which reflects not upon them, and which ignorance alone could apply to them. Naturalists and the vulgar alone have misunderstood the bearing of the passage: the commentators have seen it in its proper light, as explained above by Dr. Heineken; and Mr. Douce expressly remarks, "The meaning is

no one will, I think, accuse him of lending his sanction to the mawkish cant of those puling sentimentalists, who

“Compound for sins they are inclin'd to

“By damning those they have no mind to,”

and while they either directly or indirectly encourage the emasculation (neither a pleasant nor a painless operation I take it) of whole races of animals, from the *Mammalia* downwards, the crimping of cod, skinning of eels, boiling of lobsters and roasting of geese alive! for the mere gratification of a sensual appetite; and the impaling of worms, embowelling of frogs, “playing with”* trouts, &c. &c. for the most contemptible of all amusements; are ready to faint over a legless fly, or to “die of a rose in aromatic pain.” Whether Shakspeare supposed mutilation to be equally painful to the one as to the other, he gives us no opportunity of judging, but from his general truth to nature we have a right to infer that he did not. Pope, the poet of art, might for the mere gingle write “Why has not man a microscopic eye?” and with as much sense reply “For this plain reason, man is not a fly;” (although the former has the most truly microscopic organ of vision of any animal, and the latter a very imperfect one,) because no one ever supposed him to have known better; because he was a great deal too learned in perfumes and curling papers to condescend to such trifles as those of natural science; and because the best poem he ever wrote was the most artificial one that ever was written: but Shakspeare both knew better and wrote better.

As I happen to be just now in a critical humor, and as I only follow their example both in its indulgence and in the subject upon which I am exercising it, I would for a moment turn to p. 392 of the same volume, where Messrs. Kirby and Spence have quoted “shard-born beetle” as Shakspeare's, and wishing to see a little deeper into the millstone than “the commentators,” have added in a note, “it might have thrown

“—fear is the principal sensation in death, which has no pain; and the giant, when he dies, feels no greater pain than the beetle.”—E. T. B.

* That is, drowning a miserable animal *by degrees*, with a barbed hook in his vitals by way of a soother, and a line constantly tugging at it to remind him of its presence.

“ some weight into the scale of those who contend for the orthography above (born) and that the meaning of *shard* in this place is *dung*, if they had been aware that the beetle (*Scarabæus stercorarius*) is actually born amongst dung and nowhere else, and that no beetle which makes a hum in flying can with propriety be said, as Dr. Johnson has interpreted the epithet in his Dictionary, “ to be born amongst broken stones or pots.” They also state, on the authority of Mr. MacLeay, that *sharn* is the common name of cow-dung in the north, and that therefore Shakspeare probably wrote *sharn-born*.” In Antony and Cleopatra, when they are talking about the love of Lepidus for Cæsar and Antony, Agrippa says, “ Both he loves,” to which Enobarbus adds, “ They are his shards and he their beetle.” Now as Shakspeare would hardly call the same thing *sharn* in one place and *shard* in another, and as it is clear that *sharn*, that is, cow-dung, in the mouth of Enobarbus would be palpable nonsense, and *shard* as a beetle’s birth-place in Macbeth, and its wing-covers in Antony and Cleopatra would be even a worse jumble than “ broken stones and pots,” I am really almost bold enough to doubt whether the idea of either dung or crockery ever entered his imagination. The original meaning of the word *shard*, namely, “ a broken piece of tile or earthen vessel” (see Bailey’s Etymological Dictionary) having, in all probability, before his time, suggested its application to the wing-covers of beetles, in the same way as its Latin synonym, *testa*, had been applied to the covering of shell-fish, &c.; for there is not the shadow of an authority, I believe, for supposing that *shard*, in its most extended sense, ever did or could mean dung : and to substitute *sharn* for it, merely because it has that meaning in a part of the kingdom with which he was unacquainted, appears to me to be rather a greater liberty that “ we petty men” ought to allow ourselves.*

* On the meaning of the word *shard*, there is so much to be said, that we protest against opening the pages of the Zoological Journal to the discussion of its precise value in every instance in which it has been used. That scales and dung were both included in its significations, admits of no doubt. Shakspeare has himself used it with at least two different meanings. In its primitive sense, that given by Bailey, “ a broken piece of tile or earthen vessel,” (*potsherd* of the English translations of the Bible,) it is used in Hamlet: the Priest says of Ophelia, “ *Shards*, flints, and pebbles, should be thrown on her.” Here it can scarcely

In the last (16th) number of this Journal is a paper by Mr. MacLeay on the *Ceratitis citriperda*, and although he has not given a detailed description of it, yet from the figure and the statement of its "having been seen on some oranges in the market-place of Funchal," I have

be supposed to mean either the *elytra* of beetles, or dung. That *shards* signified *scales*, is shown by a passage in Gower, who speaks of "a dragon—whose "shardcs shynen as the sonne." If we admit, and the sense appears to require it, that by shards in the passage quoted above from Antony and Cleopatra, Shakspeare meant scaly wings, or *elytra*, we have here a second meaning. A third instance of its use by Shakspeare occurs in Cymbeline, where it is said, "we find The *sharded* beetle in a safer hold Than is the full-winged eagle." Here the epithet applied to the beetle may also mean *covered by elytra*, as opposed to the full wings of the eagle; and such is the interpretation given to it by Steevens, Malone, Holt White, and Archdeacon Nares. But in this instance it is also possible that a third signification may attach to it, that given by Tollet; that the "*sharded beetle* means *the beetle lodged in dung*," its humble earthly abode "being opposed to the lofty eyry of the eagle." The proofs adduced by Tollet that *shard* signifies *dung*, (cowshard, according to him, being the word generally used in the north of Staffordshire for cow-dung), are from A polite Palace of Pettie his Pleasure, &c. "The humble-bee taketh no "scorn to lodge in a cow's foul shard:" and from Bacon's Natural History, "Turf "and peat and cow-shards, are cheap fuels, and last long." To these Mr. Holt White adds, from Dryden's Hind and Panther, "Such souls as shards produce, "such beetle things," a quotation bearing very closely upon the subject. A corresponding quotation to that adduced from Bacon is to be met with in A true report of Capteine Frobisher his last voyage, &c., where it is said in the Orkneys that "They are destitute of wood, their fire is turfes and cove-shardcs." In Ben Jonson's Tale of a Tub, one of the characters exclaims, "Marry a cow-shard!" In the opinion of Archdeacon Nares, this meaning is derived from the preceding one, "Cow-shards," he says, "appear to mean only the hard "scales of dried cow-dung."

That it was unnecessary for the purpose of obtaining the signification dung to change the orthography from *shard* to *sharn*, is shown by the previous quotations. Authority for the latter, and closely applying to our subject, is, however, to be met with in A briefe Discourse of the Spanish State, quoted by Mr. Holt White, "How that nation, rising like the beetle from the cowshern, hurt-leth against all things." Still more apposite, although scarcely likely to be met with, unless by a naturalist, is the "*Scarabæus stercorarius vel fimarius*, "a dung Beetle, or Sharnbug" of Merrett's Pinax, page 201.—E. T. B.

no doubt that an insect which I had hoped might prove a new species of Latreille's *Tephritis* (and a pair of which I sent to him a short time back) will turn out to be the same. In the colours, nervures, and marks of the wings, and the sexual appendages of clavated horns, it precisely corresponds with the figure.

I first observed it at rest, as though basking, and with the wings expanded, on the leaves of some thick shrubs, in the garden of the English church. In the surrounding gardens were orange, lemon, and other fruit-trees, but not in that where I found it, and which it was afterwards in the habit of frequenting. It had the manners and appearance of an insect of very confined locomotive powers and activity, and I have seldom seen it upon the wing further than passing from one shrub to another, and never upon flowers, or with the attitude and appearance of one either eating or searching after food. I should infer, therefore, as well as from the general *habit*, if that be not too empirical, that it is short-lived and eats little or nothing in its perfect state.

The insect is by no means uncommon with us, and I have subsequently taken it on the orange-tree, and many others. On the 14th of February, 1828, I find, by referring to a note-book, that "several were hatched from pupæ found in a decayed lemon." I have also a distinct recollection of having hatched them from peaches,* but as I cannot find the circumstance mentioned, I must leave it to future investigation. The principal object I have in mentioning the insect now, is to induce others to look for it in other fruits besides the orange, to which I suspect it will prove not to be confined. I am looking anxiously for Mr. MacLeay's promised details. I trust that now *he* has turned his attention to them, the interesting group to which it belongs will be well elucidated.

Mr. Curtis, I see, (British Entomology, No. 148) gives as *Blaps obtusa*, Fab., *Bl. similis*, Lat., and *Bl. lethifera*, Marsh, an insect which, from his own shewing, cannot, I think, be the first of the three, and answers only indifferently in figure to the second. In his figure and de-

* Six or eight which I have of a variety, (smaller and paler, but differing in no other respect,) were certainly not hatched from oranges.

scription the *elytra* are mucronate; now Fabricius, in the Supplement to the *Entomologia Systematica* says, "*elytra nullo modo acuminata*." Latreille too, in the "*Histoire, &c.*," when he considered the *Bl. similis* as a variety only of the *Bl. mortisaga*, says, "*peut-être est-ce le Blaps obtus de Fabr.?*" but in the "*Genera, &c.*" a more recent work, and in which he establishes it as a species, he is silent about its being synonymous with the *Bl. obtusa* of Fabricius. Mr. Curtis appears to me also to be in error about the sexual distinctions. He says that the *elytra* are mucronate, "especially in the males, in which sex there is a fascicle of hair at the base of the second abdominal joint beneath." In some dozens of specimens (for it is abundant here) those with a tuft of hair had also mucronated *elytra*; and as one not having either of these peculiarities protruded the *penis* when dropt into boiling water, I have kept it as a better proof than many dissections could afford, that the contrary is the case, and that the prolonged *elytra* and tuft of hair are female peculiarities. Messrs. Kirby and Spence say of the *Blapsidæ* generally, "*elytra mucronate in the females*," but neither they nor any other writer besides Mr. Curtis mention, as far as I am aware, the tuft of hair. The *Blaps gages*, and its small variety, which Latreille considers the *Blaps mortisaga*, Herbst, have it in one sex also.

C. HEINEKEN, M.D.

Funchal, Madeira, 8th August, 1829.

P.S. As I conclude that a poetical licence will not always be allowable with the *Zoological Journal*, I will avail myself a little further of the present, to ask what birds Shakspeare means in "*A Midsummer Night's Dream*," by "*russet-pated Choughs, many in sort*."—The bird now, I believe, commonly called "*Chough*" (*Pyrrhocorax graculus*, Temm.) is not *russet-pated*; neither are the Pie, Daw, Hooded Crow, &c., and yet it is evident by the succeeding line, "*Rising and cawing*," &c. that the birds he referred to belonged to this group. "*Many in sort*,"* too, would either imply variety of plumage, or several species: now both Fleming and Bewick give only one species of Chough, and the only variety of consequence consists, I believe, in the bill and legs of the young being black instead of red.

C. H.

* *Many in sort* means nothing more than *many in company*. Of the continual use of *sort* in this sense, scores of instances could be adduced.—E. T. B.

ART. XXXI. *Observations on the Quadrupeds found in the District of Upper Canada extending between York and Lake Simcoe, with the view of illustrating their geographical distribution, as well as of describing some Species hitherto unnoticed.* By DR. GAPPER.

The sign * denotes that I have seen but imperfect specimens; ** that I have only been told of the existence of the species. The numbers prefixed refer to Dr. Richardson's "Fauna Boreali-Americana."

(1.) *Vespertilio pruinosus* (Say.)* Hoary Bat.

(2.) ——— *subulatus* (Say.) Say's Bat.

The most common Bat in the home district. It agrees exactly with Dr. Richardson's description; the measurement is nearly the same.

(4.) *Sorex Forsteri* (Richardson.) TAB. VII. Forster's Shrewmouse.

The first upper grinder is certainly larger, not smaller, than the two next; in other respects Dr. Richardson's description of the dentition agrees exactly.† The length of the head and body is $2\frac{1}{4}$ inches: that of the tail rather more than $1\frac{1}{2}$ inch. Two specimens weighed 42 grains each.

The tail is square, and rather largest in the middle. The colour of all the upper parts is nearly a middle tint of burnt umber; the under parts are light yellowish brown; the feet are rather darker than the belly.

This little animal is very common in this district, and I have frequently found it frozen on the surface of the snow in the beech and maple woods. The only two specimens which I could procure in a good

† If Dr. Richardson's description of the dentition of *Sor. Forsteri* be correct with respect to the first upper grinder being smaller than the two following ones, this must be, I should think, a distinct species, but as that tooth is the largest in all other species which I have examined, I am inclined to think that it is a mis-print. The length of the tail also differs, but as the Doctor says that his description was made from a prepared specimen, this may arise from shrinking in drying.

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state, had been drowned in a well. A very small Shrew is said to be found in the more southern settlements on Lake Erie, which is most probably the same species.

Sorex talpoides (nobis.) Mole-like Shrew.

Shrew with a round tail, about as long as the head ; short furry ears ; eyes very small, and surrounded with a naked skin ; upper parts dark greyish brown ; under parts the same tint, but lighter.

TAB. VIII.

Dental formula, intermediary incisors $\frac{2}{2}$, lateral incisors $\frac{5}{4}-\frac{5}{2}$, cheek-teeth $\frac{4}{3}-\frac{4}{3}=32$. The teeth are brown, except the parts immediately above the roots ; the upper intermediary incisors have a semicircular notch behind ; the second lower lateral incisor is the largest, the next two are much smaller, and the fifth is the smallest of all ; they all have a small lobe on their inner side ; the lower intermediary incisors are crenated on their upper edge.

The muzzle is rather shorter, and the face more conical than those of most Shrews ; the nose is rather broad, the eye is very small, and surrounded by a naked skin ; the ear is short, furry, and completely hid ; the fore feet are rather wide, and furnished with pretty strong nails, and a slight fringe of stiff hairs on the outer edge of the metacarpus only ; the hind feet are small and weak ; the tail is round, scaly, and hairy. The fur, for the greatest part of its length, is bluish grey, the tips only being bistre brown, so that the grey shows through ; the feet are light bistre brown, and the nails white.

Length from the nose to the insertion of the tail $4\frac{1}{4}$ inches ; of the tail full 1 inch.

This Shrew is common in the district, and appears to prefer marshy places. The drawing was taken from a living specimen caught in an old overflowed cellar ; it was a female.

- (6.) *Scalops Canadensis* (Cuvier.)** Shrew Mole.
- (8.) *Ursus Americanus* (Pallas.) American Black Bear.
- (11.) *Procyon Lotor* (Cuvier.) The Raccoon.
- (14.) *Putorius vulgaris* (Cuvier.)** Common Weasel.
- (15.) ——— *erminea* (Cuvier.) The Ermine.
- (16.) ——— *Vison* (Richardson.) The Vison or Minx.

The measurement of my specimen, when recent, from the nose to the

insertion of the tail, 12 inches; of the tail itself 6 inches. It was a female, and its stomach contained the half-digested remains of a frog. There are two stuffed specimens of a larger species of Mink preserved in the Museum at New York: perhaps this may be M. Cuvier's *Mustela Vison*, since the Baron could hardly have overlooked the character which led him to devise the genus *Mustela*.

(17.) *Mustela Martes* (Linn.) The Pine Marten.

The Pine Marten is very common about Bristol, and I have seen many specimens, all differing from the Canadian animal in the patch of yellow on the throat being uniform in colour and figure; whereas in the Canadian Pine Martens the patch is irregular in shape, and spotted with brown, the head is also grey and fox-like. There is a Marten described in Silliman's Journal as the Fox-like Marten, and those in this district appear to belong to that species or variety, for it must be granted that individuals are to be found approaching very near our species in the particulars above noticed.

(18.) *Mustela Canadensis* (Linn.) The Fisher or Pekan.

Length from the nose to the insertion of the tail $19\frac{1}{2}$ inches; of the tail $15\frac{1}{2}$ inches. The specimen was a female.

(19.) (*Mephitis*) *Americana*.** The Skunk.

(20.) *Lutra Canadensis* (Sabine.)* Canada Otter.

(22. A.) *Canis Lupus griseus*.* The gray Wolf.

(26.) *Canis (Vulpes) fulvus* (Desmarest.) The American Fox.

(26. γ.) ————— *argentatus* (Desmarest.) Black or Silver Fox.

(30.) *Felis Canadensis* (Geoffroy).** Canada Lynx.

(33.) *Castor fiber* (Linn.) The Beaver.

Now very rare, though their old embankments are to be still seen on most streams.

(34.) *Fiber zibethicus* (Cuvier.) The Musk-rat or Musquash.

(35.) *Arvicola riparius* (Ord ?) Bank Meadow Mouse.

Length of the head and body $5\frac{1}{4}$ inches; of the tail 2 inches. This is the most common Mouse in the fields of Upper Canada, making shallow burrows under every fallen tree, and also under rails, hay-ricks, &c., and in the winter beneath the snow. The female makes her nest of grass, under logs. It frequents also the barns.

Arvicola Gapperi.†

Meadow Mouse, with a tail more than half the length of the body ; short rounded ears ; the back and upper part of the head chestnut ; sides and face yellowish brown ; belly yellowish white ; chin and throat ash-coloured.

TAB. IX.

This Mouse is common on the steep banks of streams in the woods, burrowing like the former ; it is very fond of meat, and annoys the trapper by eating the baits set for the Marten, and by throwing the traps.

It is about 4 inches long from the tip of the nose to the insertion of the tail ; the tail itself $1\frac{3}{4}$ inch. The head is moderately large, and the nose on a line with the teeth : certainly it is not sharp-nosed like Dr. Richardson's *Arv. Noveboracensis*, the only species which at all agrees with it ; the feet are whitish. I have caught several, all agreeing in colour, size, &c.‡

Mus decumanus (Linn.)* The Brown Rat.

Introduced. Only found in the warehouses near Lake Ontario.

Mus Musculus (Linn.)* The common Mouse.

Introduced. Very common all over the country. A great many are frozen to death in the barns, where the native mice live in perfect security.

Cricetus myoides (nobis.) Mouse-like Hamster.

Hamster with a tail longer than the body ; large eyes and ears ; upper half of the body mixed black and light reddish or yellowish brown ; lower half pure white.

TAB. X.

Dental formula, incisors $\frac{2}{2}$, canines $\frac{0}{0}$, cheek-teeth $\frac{3\frac{3}{4}}{3\frac{3}{4}}$. The cheek-teeth have long roots, and are crowned with several little blunt tubercles and convoluted ridges of enamel. It measures $3\frac{3}{4}$ inches from the tip of the nose to the insertion of the tail ; the tail itself $3\frac{1}{4}$ inches. The nose

† Dr. Gapper having left this new species unnamed, we take the opportunity of designating it by the name of the discoverer.—ED.

‡ Dr. Richardson to whom Dr. Gapper's MS. has been communicated, remarks, " this *Arvicola* differs from my *Arv. Noveboracensis*, in having more " conspicuous ears, and is probably the animal Rafinesque named *Noveboracensis* ; but as his description is insufficient for correct discrimination, a new " name had better be given to Dr. Gapper's animal.—J. R."

is sharp, and projects more than two lines beyond the incisors ; the eyes are large and prominent ; the ears large and ovate ; the cheek-pouches, when distended, reach to the ear ; the tail is scaly and hairy ; the legs and feet are stout.

The fur consists of hairs either entirely black, or tipped with yellowish or reddish brown ; the black hairs are the longest, and predominate on the back and top of the head ; there is generally a blackish spot at the roots of the whiskers, and a whitish one before the ear. The whiskers are very long, some black, others white. The under parts, including the legs, are pure white.

This animal bears a considerable resemblance in form and colour to Dr. Richardson's *Mus. leucopus*, which it rather exceeds in size ; but the very evident cheek pouches distinguish it generically from Dr. Richardson's new species.

This pretty little Hamster is very common in all the district, climbing trees with facility, and making a nest of thistle-down in their hollows, either towards the top or at the root ; it is quite a pattern of industry and fore-thought, for, although it lays up a winter store of full half a peck of corn or other seeds, it nevertheless runs about in search of food all the winter, following the cattle track, and picking the undigested corn out of their dung, regardless of deep snow or severe frost. It frequently makes its nest in barns amongst the hay, where it also lays up its store.

(46.) *Meriones Labradorius* (Richardson.) Jumping Mouse.

The female makes a nest of grass ; my specimen had made her's under the sod in a furrow, and had five young ones ; she measured $3\frac{3}{4}$ inches from the nose to the insertion of the tail ; the tail itself 5 inches.

(47.) *Arctomys Empetra* (Schreb.) Quebec Marmot. Ground Hog of the settlers.

This animal is solitary in its habits, and makes its burrow in dry sand-barks. It is not uncommon.

(57.) *Sciurus Lysteri* (Ray.) Chipmunk of the settlers.

Very common. It is constantly seen running on the rail-fences, and hiding among brush-wood, uttering a peculiar squeak when started ; if hunted it runs up trees, but soon endeavours to descend, and by making a great spring, tries to reach the ground and escape to its burrow.

(59.) *Sciurus Hudsonius* (Pennant.) The Chickaree Red Squirrel.

It has no cheek-pouches, though placed by M. Cuvie: in the division

furnished with these organs. The pencil of hair on the ears of winter specimens is more distinct than it is represented in Dr. Richardson's plate, and the black line on the sides is always more or less distinct; probably these differences are owing to the fur never becoming so long in these latitudes.

(60.) *Sciurus niger* (Linn.) The Black Squirrel.

I have generally found them to measure from the tip of the nose to the insertion of the tail rather less than a foot; the tail itself 13 inches. They are most commonly entirely black, but I have shot several with patches of light brown on the belly, each hair ringed with black; in other specimens, still more rare, with the whole under parts of this colour, and with many of the hairs on the back and tail ringed with yellowish white. The ears of the Black Squirrel are covered with adpressed hairs in the summer, but in the winter those on the upper side are lengthened so as to over-top the ear about half an inch. It is found in all the settled parts, varying, according to my observation, only as stated above. I have shot many dozens of them. It makes its nest in hollow trees, filling the cavity with thistle-down, in which warm material it buries itself when it retires to rest.

I have observed the recent tracks of these Squirrels made in the snow during the severest weather, but they do not seem to remain long at a time out of their nest during inclement weather.

Sciurus leucotis (nobis.) White-eared Squirrel.

Grey Squirrel with a tail rather longer than the head and body; white ears; the upper parts varied with a mixture of white, black, and ochry; under parts greyish white; tail edged with white.

TAB. XI.

This Squirrel measures, from the nose to the insertion of the tail 12 inches; the tail itself 13. The fur has little lustre, and is slightly crisped. The hairs on the upper parts and tail are all annulated with ochre and black, or black and white; on the head, and a broad stripe along the back, the tips are ochry; on the cheeks, a stripe on the sides next the white of the belly, and on the upper part of the foot, excepting the toes, the hair is almost entirely ochry; on the rest of the sides, limbs, and outside the tail the hairs are mostly tipped with white; the under parts are entirely greyish white; round the eyes and back part of the ears they are pure

white; in front and at the tips of the ears they are ochry; in the winter the fur is about half an inch longer than the tips of the ears, forming a kind of pencil; in summer these hairs are short and adpressed both on the ears and round the eyes, giving these parts rather a light ash-colour than pure white.†

This Squirrel is not common in the district. I have seen them in New York, and a grey Squirrel is said to be more common in the more southern settlements of Canada, and to be very like that which I have described. The size of the *Sciurus magnicaudatus*, as given by authors, is very different, as well as the proportion of the body and tail, and the fur of the only specimen of the Carolina Squirrels which I have seen, is very unlike this, and the ears are of the same colour as the back.

Pteromys volucella. Common Flying Squirrel.

Head and body nearly six inches, tail rather more than four.

(68.) *Lepus Americanus* (Erxleben.) American Hare.

Feet large in proportion to the size of the animal.

(77.) *Cervus leucurus* (Douglas.)* Long-tailed Deer.

NOTE.

For the representation of the five new species of *Mammalia*, described in the preceding paper, the proprietors have to acknowledge their obligations to Dr. Gapper who has kindly given to them the use of the plates which he had prepared for another work. With equal liberality Dr. Gapper has presented to the Bristol Museum specimens of each of the new species above referred to.

ART. XXXII. *On Conchology, regarded as a distinct branch of Science.* By HENRY JAMES BROOKE, Esq., F.L.S., M.G.S., &c.

THE attention of naturalists having been recently drawn to the general subject of systematic classification, the editors of the Zoological Journal

† " This animal seems to belong to some of the varieties, as they have been termed, of the *Sciurus cinereus*, but I think the shape of its ears is a sufficient mark to distinguish it from the live ones in the Zoological Museum.—J. R."

will perhaps afford space for a few remarks on what is properly termed Conchology—the description and classification of shells.

This branch of natural science appears to have been involved by some late writers in very considerable and very unnecessary obscurity and confusion, by an attempt to render it dependent upon the anatomical and physiological characters of the animals by which shells are produced, and by so confusing the descriptions of the animals and the shells, as frequently to render it extremely difficult for a reader to discover to which the descriptions relate.

The language too in which these descriptions are given, and which is generally derived from the characters of the shells alone, presents another source of great confusion whenever by implication the description can be supposed to have reference to animals. It is also obvious that a description of shells, founded upon the characters of the animal inhabitants, cannot even now be given in reference to very many recent species, and can never be applied to fossil shells whose animals are entirely unknown.

This attempt to identify shells with animals, or animals with shells, seems to have arisen from what will, on more mature consideration, appear to be mistaken views of the real objects of Conchology when regarded as a science.

That a study of the names and distinguishing characters of shells, for the sole purpose of collecting and arranging them in a cabinet, has little to do with science, and is not one of the highest exercises of intelligence, will be readily allowed; but as long as even this trivial and unimportant pursuit affords occupation and amusement to many whose attention might otherwise be devoted to less rational and less innocent objects, this restricted study of shells deserves to be encouraged; and particularly when it is recollected, that if it were not for those who are merely shell collectors, and who are accustomed to pay such prices for very perfect, or new specimens, as tempt mariners and other travellers to collect and preserve them, it is probable that comparatively few of those objects would ever be brought within the reach of the scientific naturalist. But it will not be disputed that the ultimate purpose of Conchology, regarded as a branch of natural science, is to illustrate the natural history of shell-bearing animals in their perfect state, that is, of

the animal and shell conjointly. This, however, is not to be done by describing a shell, and calling it an animal, nor by imperfectly describing an animal of which very little may be known, and denoting it by the name which has been previously given to the shell that covers it—a name, as *Monodonta*, almost generally derived from some character of the shell alone.

If the animal inhabitants of all known shells were known, a classification of those animals with appropriate generic and specific names, according to the method adopted by Poli, would supply what might properly be termed “An Account of Molluscous Animals;” but even in this case it would be important to the naturalist to have the shells also accurately studied, and perhaps separately named and described, in such manner as might best exhibit their peculiar relations to the characters and habits of their respective animals. And if there should be found some inconvenience in having two sets of names and a double classification, this would be more than compensated by the increased perspicuity of the method.

But if it would be useful to possess this double classification where the animals are known, it becomes strictly necessary to keep the two systems distinct, in order that one of them should embrace the fossil shells.

The proper study of shells may indeed not unaptly be considered analogous to that of the skeletons of the higher classes of animals, and may be regarded as the comparative anatomy of the molluscous inhabitants; and if it were so pursued, those who study shells alone, might, without the fear of being regarded as triflers, confess themselves to be conchologists, and might thus assert their title to a place in the ranks of science, on account of the additions they might, by induction, supply to the present scanty knowledge of the shell-bearing animals.

A few extracts will now be given from some of our latest writers on these subjects, to shew the unsettled state of opinion upon even the first principles of the method of treating this branch of natural history.

Montagu, in his “*Testacea Britannica*,” published in 1803, (Introduction, page 27,) says, “The *Ascidia* is rather a numerous genus” (of animals,) “is found to inhabit *Pholas*, *Solen*, some of the *Mya*, *Mactra*, and “probably part of other bivalve *Testacea*: many species of the genus “*Ascidia* are *Mollusca*”—the term *Mollusca* is here applied to animals

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destitute of shells. And as *Pholas*, *Solen*, *Mya*, *Macra*, are some of his *genera* of shells, he evidently adopts the Linnean principle of establishing a classification and nomenclature of shells distinct from, and independent of, that of the animal inhabitants.

In 1822 a work was published by the Rev. Dr. Fleming, entitled, "The Philosophy of Zoology, or a General View of the Structure, Functions, and Classification of *Animals*." And in 1828 the 1st volume appeared of "a History of British Animals," by the same author, exhibiting a systematical arrangement of their genera and species.

At page 406 of the first of these works, Dr. Fleming says, "the characters furnished by the skin and its *appendices* are extensively employed in the systematical arrangement of *molluscous animals*. Nearly all those characters which distinguish the *species*, and many of those on which *genera* are established, are derived from the *form of the shell*, the *tentacula*, or the colour." If this be really so, that the *form of the shell* may supply both the generic and specific characters of the animal, the study of shells alone becomes even more important than it has been already supposed. It will, however, appear afterwards that the very reverse of this process is recommended in a later work.

The subject is again adverted to by Dr. Fleming, at page 430 of the same volume, where he says, "enough is known of the *animals* of *Spirula* and *Nautilus* to furnish some hints for those who are fond of classifying animals from *their analogies*." A passage which seems to imply dissent on the part of the author from the method of classing these animals from their *analogies* rather than from their shells; a dissent, however, from the only principle upon which, it would appear, a correct classification of *animals* can be established.

It is from this conflict of first principles, and the practical consequences to which it has given rise, that the ambiguity and uncertainty are produced which meet the conchological student at every stage of his enquiry. If, for example, he turns to the division *Cochleadae* of Dr. Fleming's British *Animals*, (page 255,) he observes that the first genus is named *Cyclostoma*, and which hence would appear to be an animal. But he has perhaps seen a shell so named, and he is therefore at a loss to know whether the term *Cyclostoma* implies an animal or a shell. To satisfy his doubts he turns to the description of this genus, and he there finds

that the species *Cyclostoma elegans* is the same as is described in Montagu's "Testacea Britannica," as *Turbo elegans*. He accordingly turns to Montagu's work, and finds that *Turbo* is a shell, and that the animal inhabitant is stated to be a *Limax*. He discovers also that the name *Cyclostoma* was given to the shell in question from the circular form of its aperture, a character to which Dr. Fleming does not allude; but this discovery brings with it a new embarrassment, for the second species of Dr. Fleming's *Cyclostoma* is described as having an *ovate* mouth.

He turns over the remaining pages of Dr. Fleming's descriptive characters without feeling his difficulties much removed: on the contrary, they are frequently increased by the numerous typographical errors with which the volume abounds, (and which will doubtless be corrected in another edition,) as well as by the occasional inattention of the learned author—as where he describes the *shells* belonging to the animals of the first division of the *Siphonida*, page 408, as having the beaks *obsolete*; the first genus of that division, *Mytilus*, as having the beaks *acute*; and the first species of *Mytilus* as having the beaks *blunt*.

The enquiries of the student not having been satisfied elsewhere, he now refers himself to Mr. Sowerby's "Genera of Recent and Fossil Shells," and here he is again doomed to disappointment; for notwithstanding the practice of accurate observation which is evinced by the descriptions contained in Mr. Sowerby's work, and the occasional influence of his better judgment in shaking off the trammels with which his subject has been surrounded, he allows himself too frequently to be influenced by the reigning notion, that in his descriptions of shells he must always appear to think and talk about *molluscous animals*.

Under the genus *Pullastra*, Mr. Sowerby implies, that it is the *habits* of the *animals* which ought to be the foundation of the genera of *shells*. If the *habits* of the animals be not here taken to mean the *shells* themselves, it is evident that no genus of fossil shells can ever be established.

The title of Mr. Sowerby's work is the "Genera of Recent and Fossil Shells," yet under the genus *Magilus* he speaks "of giving the genera of "all *animals* whose habitations have usually been called *shells*," and under this view he will doubtless include the *Hermit Crab*.

Under *Melanopsis*, Mr. Sowerby quotes from M. de Férussac, "The "genus *Melanopsis* is one of the most interesting of *molluscous animals*":

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yet a few lines further on, he has the expression, "The *shells* which form this genus," &c. Is, it may be asked, *Melanopsis* an animal or a shell, or both? and is not the name derived from the shell?

Under *Catophragmus* Mr. Sowerby alludes to "correct first principles"—he, however, states that these "are only to be obtained by the study of the *Mollusca* which form and inhabit shells," "yet (he says) the shells themselves may in *most cases* be regarded as indicating many of the more important facts in connection with the history of their animal inhabitants, and may consequently be generally considered as sufficient to demonstrate characters strong enough for the establishment of genera." But genera of what? animals or shells? If of *animals*, they do not properly belong to Mr. Sowerby's work on shells, and if of *shells*, the passage means no more than that genera of *shells* may be established upon the characters of *shells* alone. The remark that genera of animals form no part of Mr. Sowerby's work is strongly enforced by himself, under the genus *Dentalium*, where he says, "whatever may be the nature of their animals, we are engaged to give an account of *shells alone*." And the genus *Anostoma* affords an instance of the establishment of a new genus from the form of the shell alone, where the animal is supposed to resemble that of *Helix*. The consequence of thinking about animals while writing about shells, is the occasional production of observations which could not otherwise have been made; as, for example, the quotation from Lamarck, under the genus *Cassis*, "that the *shells live* in the sea at a distance from the shores, and upon sandy bottoms, where they *bury themselves* in the sand." And under *Achatina* Mr. Sowerby speaks of *shells* of different characters and *habits*.

It is not obvious what is intended to be implied by the phrase *habits* of *shells*, if it be not their *colours* and their *epidermis*, (the latter of which, it may be observed, is frequently a very *loose habit*,) unless indeed the practice of *burying themselves* be termed a habit, to which we are perhaps indebted for the preservation of the numerous fossil specimens that now exist, and which may be conceived to have formerly practised self-interment more or less profoundly, in all the then subjacent beds of seas and lakes.

A similar want of precision in the use of terms connected with this

branch of science may be observed in the title of a new work recently advertised by Mr. Children and Mr. Gray, which professes to be "An Introduction to the Study of Recent and Fossil Shells, and the Animals which inhabit them," a title which clearly cannot be verified by the work itself, in relation to fossil shells.

But enough has been said to shew the entirely unsettled state both of the opinions and language of recent authors on shells and their inhabitants, and to evince the necessity of establishing some more precise and definite system of conchology, upon principles which, if shells are still to be considered worth preserving and receiving names, should be immediately derived from the shells themselves.

It is well known that a system of conchology, or a method of classing shells, has been proposed by M. de Blainville, but adapted in some degree to the classification of the animals. He has, however, introduced two distinctive characters, the operculum and the epidermis, both of which, from the unfrequency of their continuance with the shell, must generally become unavailable. There has also been a purely conchological work produced by a Danish naturalist, Mr. Schumacher, which has no reference to the *molluscous animals*. An analysis of this work would not render the pages of the Zoological Journal less generally interesting than they are at present, and might afford some useful hints to Mr. Sowerby in preparing his promised work on the *Species of Shells*.

ART. XXXIII. *On the Affinities of the Genus Clinidium of*
KIRBY. By J. O. WESTWOOD, Esq., F.L.S., &c.

WHEN we contemplate the immense number of insects already supposed to be contained in our cabinets, estimated by Mr. MacLeay to amount at least to 100,000, and when we are aware that it is the opinion of some eminent authors that this number is but one-fourth part of the species actually in existence, (an opinion which appears to be well founded, from the number of new species which the arrival of every collection adds to our store,) the remarks which the entomologist occasionally

hears from those, but little interested in the subject, about the endless bounds of the Science, &c. may not perhaps be wondered at, although they are to be regretted, as it is not to be doubted that they have repeatedly tended to deter many a Tyro from proceeding in the science. To those, however, who are more deeply versed in the subject, the increase of our knowledge of new species either of insects, or of any other group of beings, is an object of the most lively interest; and to none more so than to those whose more immediate object is the discovery of affinities, and the consequent development of the natural system, employed in the creation and distribution, not only of the insect tribes, but also of every branch of the organized creation; and hence every new insect added to our collection, "which of itself," as Mr. MacLeay observes, in the *An-nulosa Javanica*, "scarcely raises a thought in our minds beyond what "may originate in its splendour of colour, or its eccentricity of form, "becomes absolutely important when described in reference to its fellows."

I have been led into these remarks by the interesting observations of Mr. Kirby, contained in his communication upon the new genus *Clinidium*, published in the last number of this Journal. The insect forming that genus is represented by Mr. Kirby to present characters of several different and distant tribes, so that after a very close inspection, and diligent comparative investigation of its characters, he states that he feels uncertain to what modern group, larger or smaller, to refer it.

The object of the present paper is to offer some observations upon its affinities and analogies; but knowing, as I do, the extreme hazard attending the promulgation of opinions upon the situation of objects which so well illustrate Latreille's remark upon *Stylops Melittæ*, "Animal animæ excrucians," I must rely upon the indulgence of the more advanced student towards the following pages. It will be seen, however, that I have endeavoured to depend as little as possible upon my own individual opinions, contenting myself rather with collecting the observations of authors who have preceded me. And should it perchance be objected, that this paper describes no new object, I confidently trust that the interest which must necessarily attach to the opinions of the celebrated men whose works I have quoted, (more especially as the objects of these opinions belong to tribes which materially disturb the tarsal system of

Coleoptera,) and the attempt which I have made to render the structure of already described insects more fully known, will be held a sufficient recompence for the want of novelty.

In tracing affinities, perhaps, no organs are of such essential importance as the trophi, and it is consequently to be regretted, that as Mr. Kirby's specimen of

CLINIDIUM GUILDINGII.

was not dissected, some of the most material parts of the mouth remain uninvestigated. I beg, however, to call the student's attention to the characters given by Mr. Kirby of the mandibles, terminal joint of the maxillary palpi, and especially the "Mentum latum, utrinque tumidum," and the delineation of this latter organ in Plate II. fig. 2. The apterous body which is not depressed, the apparent want of reticulated eyes, and the levigated spaces regarded by Mr. Kirby as their representatives, the formation of the tips of the tibiæ, and the pentamerous tarsi, are also characters which the student will not fail to consider worthy of attention.

After the observations of Mr. Kirby on its want of affinity with the families referred to in his paper, it was with pleasure that I received an insect from Germany, singularly enough on the very day on which the account of the *Clinidium Guildingii* was published, which, even upon a casual examination, appears to bear so great an affinity to that insect, that I have little doubt that the time is not long passed when they would both have been even considered referable to the same genus. It is equally singular that the situation of the former insect has hitherto equally been matter of doubt with the authors who have noticed it.

The insect to which I refer is the

RHYSODES EXARATUS,

TAB. SUPP. XLVI, fig. 1.

The genus was proposed (but not described) by Latreille, and adopted by Illiger, Gyllenhal, Sturm, and other authors; but it was reserved for Dalman to give in the *Analecta Entomologica*, p. 93, an elaborate and detailed account of the interesting insect composing the genus. This description being unaccompanied by any figure, and the insect not having been elsewhere figured,* I feel convinced that a representation of it will not be considered an uninteresting accompaniment to Mr. Kirby's figure of *Clinidium*. There are, however, certain material characters not suffi-

* See Note A.

ciently detailed by Dalman, which I was naturally anxious to investigate, and I did not hesitate to sacrifice my single specimen of the insect, in order to render its description more complete. I shall, therefore, in the first place, endeavour to supply this deficiency, and then to point out the chief characters in which this genus and *Clinidium* resemble or differ from each other.

Amongst the characters omitted by Dalman, were those of the trophi, the following being the only description given by him of them, “ Os durum, et adeo occultatum ut ejus partes in exsiccatis vix enucleandæ. Caput subtus planum mento punctato, flavo-pubescente, anticè sinuato, lobo medio acuto; Os mandibulis brevibus, palpisque retractis, occultatis; (palpi flavescentes articulo apicali elliptico nudo):—and Latreille merely gives the following description of the trophi in the 4th Volume of the new edition of the Règne Animal, p. 487, “ Les mandibules sont, à ce qu’il m’a paru, rétrécies et presque tricuspidées à leur extrémité. Le menton est corné, très grand, en forme de bouclier, terminé supérieurement par trois dents ou pointes. Les palpes sont fort courts.”

Upon a careful examination and dissection of my specimen, I find the following noticeable characters. The posterior angles of the head are rounded—the eyes are oval, lateral, not very large, placed behind the insertion of the antennæ, and distinctly reticulated. On a casual view of the insect, it is not improbable that the two large raised lateral and posterior smooth parts of the head might easily be mistaken for eyes, and I am rather inclined to think that Mr. Guilding has considered the parts similarly situated in *Clinidium* as the eyes, more especially as Mr. Kirby’s observations leave the matter in doubt. The labrum is very minute, and semicircular, with the front slightly produced, and with a short bristle arising on each side in front (Ibid. fig. 1. B.) The mandibles are very minute, being longer than broad, and tridentate at the tips (Ibid. C.) The remaining parts of the mouth are very minute and membranaceous, and are hidden beneath the large mentum. The maxillæ are broad at the base, with the apex produced into a narrow long lobe, acute at its tip; the maxillary palpi are four-jointed, the first and third joints short, the second about twice as long as the preceding, and rather thickened in the middle, the last joint twice the length of the second, and gradually acute to the tip (Ibid. D.) This last joint is occasionally seen

beyond the mentum. The *lower lip* is attached to the inside of the mentum, and is very minute and triangular; the *palpi* are rather long, and composed of three joints of nearly equal length, the first of which is slender, the second rather thicker at the tip, and the third the thickest, especially in the middle, with the tip acute (Ibid. E.) The mentum is very large and horny, and occupies the whole of the under side of the head; its front is produced into three points, the medial being the most advanced; it is covered on the outside with punctures (Ibid. A.), and is fleshy on the inside where the lower lip and maxillæ are attached to it.

The anterior angles of the *thorax* are rounded, and the place of the insertion of the head is narrower than at its base, although, as Dalman observes, the base is narrower than the front part of the thorax.

The femora of all the *legs* are thickened; the tip, however, of each is slenderer, being hollowed beneath to receive the slightly incrassated base of the *tibiæ* in the manner represented in fig. 1, K. and L.

The tips of the four posterior *tibiæ* are slightly clothed with hairs on the inside, and are rather thicker than the rest of the joint. They are also furnished with two spines of unequal length on the inside, so that when the leg is laterally observed, the tip of the tibia appears to be emarginate (Ibid. fig. I.) The tip of the cubiti or anterior *tibiæ* is, however, different, having the inner edge produced at the tip, both above and below, into a bent obtuse spine, below each of which there is a much smaller spine, and the surface between these spines thus appears both above and below to be emarginate and ciliated (Ibid. F. G. and H.) The formation of these parts is not satisfactorily detailed in the account of *Clinidium*.

Having thus endeavoured to supply the description of the characters omitted by Dalman, I now proceed to trace the various points of resemblance and disagreement between the two genera.

If we regard general appearance or habit, as well as size, we are immediately struck with the resemblance between the insects; indeed it is even carried so far as to exist in the singular sculpturing of the head and thorax.

If we regard natural habits, we find them similar, Dalman describing the *Rhysodes* as collected in numbers by Paykull "in ligno putrido abie-

218 Mr. Westwood on the Affinities of *Clinidium*.

“tis;” and Mr. Kirby describing the *Clinidium* as taken in a rotten tree. Or if we direct our attention to structure, we find the same formation of antennæ and labrum, the same long and acute terminal joint of the maxillary palpi and minuteness of mandibles, maxillæ, labium, and labial palpi, the same subdepressed body, the similar neck, the same shortness of legs, apparently the same spinosity at the tip of the tibiæ, and the same number of joints in the tarsi.

Such are the chief resemblances, constituting a very intimate affinity; but there are numerous points of disagreement, although not of such material importance, between the two genera.

Their geographical distribution is distinct, *Clinidium* being an inhabitant of the tropical regions of the islands of the New World, whilst *Rhysodes* appears to be distributed throughout the southern half of Europe, the habitats given by Dalman being “Warnäus Blekingiæ,” Tauria, the Croatic Alps; “et ut Americæ Borealis—an recte?—communicavit Dom. Sturm.” In addition to which list M. Lefebvre has captured it in profusion in Sicily, and Latreille informs us that M. Léon Dufour has discovered it in the Pyrenees.

We also find a material variation in the formation of the mentum, which in *Clinidium* (notwithstanding the inability under which Mr. Kirby laboured to state the formation of the trophi so accurately as he could have wished) is described as being “latum, utrinque tumidum,”* whilst in *Rhysodes* it is flat and “anticè sinuatum lobo medio acuto,” forming, in fact, the under side of the head, as represented fig. 1, A. The presence of reticulated eyes in *Rhysodes* is also a distinguishing character, if these organs be really wanting in *Clinidium*; upon which question I must beg to refer the student to the observations of Mr. Kirby and those suggested above. In their general outline also, there is a considerable difference,

* It is material, for the purpose of tracing the affinities subsequently stated, to notice this formation; and a question may arise whether this tumidity is not, in fact, the bilobed production of the anterior part of the under side of the head, and whether the lower lip and its appendages do not arise between the two lobes as in *Passandra*, &c. Should, however, the mentum be transverse, and merely swelled on each side, this circumstance of itself evidently shows an approximation to the swelled bilobed formation of the under side of the head in those genera.

the head, thorax, and elytra respectively being oblong-quadrate in *Clinidium*, while in *Rhysodes* they are oblong-ovate. The sculpturing of the thorax is also distinct in the two genera, the lateral channels in *Clinidium* occupying only the basal angles, whilst in my specimen of *Rhysodes* they run parallel with the entire lateral margin. Dalman, however, describes these "Sulci laterales" of *Rhysodes* as being "basi dilatati latissimi, antrorsum angustati, ultra thoracis medium in puncta impressa desinentes," although in my specimen they are of the entire length of the thorax, as represented in my figure. The striation of the elytra is also distinct, there being in each elytron of *Rhysodes*, "Striæ octo impressæ, regulariter et profundè punctatæ, suturales ad apicem usque continuæ, intermediæ ante apicem a rugâ obliqua ? cum striolâ punctatâ interruptæ; interstitia angusta convexa lævissima impunctata;" whilst in *Clinidium* the elytra are described by Mr. Kirby as being "profundè sulcata vel porcata, porcis sex elevatis; intermediis abbreviatis, duabus longioribus apice connatis; apex ipse et basis coleoptrorum apud suturam in foveam magnam et profundam excavati." And last, but not least, *Clinidium* is apterous, and *Rhysodes* furnished with folded wings.

Having thus, I trust, satisfactorily established the intimate connexion of these two genera, I now proceed to trace their joint affinities and analogies; and in order to do this satisfactorily, I shall, in the first place, state the opinions of Dalman, Latreille, and Kirby upon the subject.

With regard to *Rhysodes*, the original location appears to have been amongst the *Terediles*, being placed by Dejean, in his Catalogue des Coléoptères, p. 40, between *Cupes* and *Ptilinus*. Dalman, however, in the *Analecta Entomologica*, disproves this location, observing, "Certe peculiare genus, nec facile in ullâ familiâ notâ pentamerorum ponendum. Insectum primo intuitu habitum fere profert Colydii vel Lycti, sed tarsorum numerus et antennarum forma nimis distant." Latreille, in the *Familles Naturelles*, p. 354, in again placing this genus with *Cupes* amongst the *Ptinidæ*, observes, in corroboration of Dalman's remarks, "Ce dernier genre (*Rhysodes*), quoique pentamère, semble appartenir plus naturellement à la famille des Xylophages ou à celle des *Platysomes*," (*Cucujidæ*); and yet the same author, in the second edition of the *Règne Animal*, Vol. IV., p. 487, still retains it in the same

situation with the remark, "Nonobstant le nombre des articles des tarses, ce genre paraît se rapprocher des Cucujes et même de certains Brentes à trompe courte dans les deux sexes. Les habitudes sont les mêmes que celles des Xylophages."

With regard to *Clinidium*, Mr. Kirby states, that "it exhibits also some general resemblance to the Rhynchophorous genus *Brentus*, which I believe is also a timber devourer, but it seems to me still nearer to *Cucujus*, Fab., as for instance, *Cuc. rufus*, which has a pedunculated head, and another North American species, which, like *Clinidium*, is pentamerous."

The observations of Mr. Kirby upon its supposed relationship with the other families mentioned by him, may, I think, be passed over in silence, that acute entomologist having himself clearly shewn that they can scarcely be regarded otherwise than as analogies. Its supposed affinity to *Brentus* having also been noticed by Latreille, in reference to the affinities of *Rhysodes*, is worthy of peculiar mention, but this, I must admit, appears to me to be extremely slight, and also not to be regarded otherwise than as an analogous resemblance.

Hence I think we may take it for granted that we ought to look for the immediate affinities of these insects amongst the *Cucujidæ* and the families which are allied to that group; and as the affinity of *Rhysodes* with *Colydium* or *Lyctus*, or the family *Xylophages* of Latreille, is not very immediate, as may be perceived from the observation of Dalman quoted above, we must consequently direct our attention to the *Cucujidæ*, and the only characters which would separate the insects in question from that family, as defined by Latreille, appear to be the pentamerous tarsi, and the less depressed form of the body, since in almost every other respect, if we consider either their structure or habits, they will be found to agree, and even in regard to the tarsi, (as Mr. Kirby has shewn, and as I hope even more satisfactorily to prove,) this difference does not, in fact, exist; with regard also to the less depressed form of the body, I cannot consider this a character of sufficient importance to allow a separation of insects otherwise intimately allied; indeed it can only be regarded as indicative of the approach towards the more cylindric form of the allied families. Still, however, it must be admitted, that this affinity is not of that nature which might be termed *immediate*, but that there are evidently some links in the chain yet to be supplied.

For the purpose, however, of tracing this affinity more minutely, I shall now proceed to an investigation of the characters of several of the insects comprized in the family *Cucujidæ*, which, from the interest excited by an examination of many of their organs, must be considered as peculiarly worthy the attention of the entomologist.

I shall commence this investigation with the *Cucujus rufus*, in consequence of its being the species supposed by Mr. Kirby to be the most nearly allied to *Clinidium*. This insect and several others of a similar formation, vary so materially from the true *Cucuji*, in many of their essential characters, as fully to warrant their separation and establishment as a distinct genus, which I propose to name, in allusion to the formation of the under side of the head,

CATOGENUS.*

Type of the Genus *Cucujus rufus*, Fab., Oliv.

TAB. SUPP. XLVI, fig. 2.

Labrum minutissimum, transversum. A and C.

Mandibulæ validæ, subtriangulares, porrectæ, extus rotundatæ, intus dentibus tribus obtusiusculis, apice unidentato. A.

Maxillæ minutæ, planæ, subtriangulares, lobo superiori majori, integro, angustato, ciliato, inferiori minuto. *Palpi* 4-articulati, in lobum dorsalem inserti, lobo superiori longiores, articulis tribus basalibus longitudine subæqualibus, sed sensim crassioribus, articulo ultimo majori, elongato, apice subacuto. D.

Mentum brevissimum, transversum, anticè paullo angustius. E.

Labium bifidum, laciniis linearibus, angustis, divaricatis, ciliatis;—*palpi* in labium lateraliter inserti, et laciniis ejus paullo longiores, articulo 1mo tenuissimo elongato, 2do brevi et paullo crassiori, 3tio 1mi longitudine, arcuato, apice subacuto. E. and F.

Antennæ moniliformes, capitis thoracisque longitudine, articulis subæqualibus (2do minori.) A.

Corpus depressum lineari-quadratum.

Caput subquadratum, depressum, angulis rotundatis, anticè *clypeo*

* Κάρω (subtus) and γένυς (gena.)

parvo paullulum producto, (C.) et posticè collo brevi instructum—*genis* subtus utrinque rotundato-productis,* maxillarum basin tegentibus. B.

Oculi parvi, laterales, reticulati. A.

Thorax oblongo-quadratus, planus, capitis latitudinem æquans sed longitudinem ejus superans, basi vix angustiori, angulis acutis.

Elytra oblongo-quadrata, linearia, plana, lateribus deflexis, thoracis latitudine.

Pedes breves, longitudine fere æquales, *femoribus* crassis, *tibiis* ad apicem crassis, et trispinosis, *tarsis* fere tibiarum longitudine, articulis 5 simplicibus, Imo. paullo minori, *unguibus* minutis.

Of the characters detailed above, the most interesting, with reference to the affinities of the genus and its separation from *Cucujus*, are the flatness and very oblong shape of the body, the formation of the antennæ and trophi, the anterior production of the lateral parts of the under side of the head, and the five-jointed tarsi.

If the general formation of the antennæ, palpi, and legs are compared, we are immediately struck with the resemblance between this genus and the two preceding.

Of this genus, which appears to be the American type of form, in addition to the *Cuc. rufus*, Fab., the cabinet of the British Museum contains two, and that of the Rev. F. W. Hope, three other distinct species.

Most intimately allied to the last genus is an insect received by Mr. Hope from Dr. Klug under the name of *Isocerus carinatus*, Klug, (MSS.?) an inhabitant of the Cape of Good Hope. This generic name (it having been employed by Illiger to designate the genus *Parandra*, and consequently sinking into a synonym of that name, and also being still employed by Megerle and Dejean for a genus of *Blapsidæ*) Mr. Hope proposes to change to

ANISOCERUS.

In addition to the geographical distinction between this genus and the last, a slight examination enables me merely to state that it also appears to differ in being considerably longer in proportion, and not quite so flat in the thorax and elytra.

* This formation is perceivable, but in a much less developed state, in *Scavrus* and *Eurychora*. Vide Kirby and Spence, Int. to Ent. Vol. III. p. 489.

In the produced formation of the underside of the head the two genera are, however, alike, as also apparently in their trophi. I was not, however, able either to examine those organs or the tarsi so accurately as I could have wished.

Of the other genera, hitherto placed in the family *Cucujidæ*, the nearest approach to the two preceding groups is made by

PASSANDRA,

founded by Dalman in the Appendix to the 3rd volume of Schönherr's *Synonymia Insectorum*, p. 146, and figured in Tab. 6, fig. 3 of that work. On its affinities Dalman merely remarked, "Statura sublinearis, depressa, et facies fere Passali." Latreille, in the *Familles Naturelles*, p. 398, correctly places the genus, without any remark upon its individual characters, in his family *Platysomes* (*Cucujipes*.) There is, however, the following interesting observation made in that work upon that family, "Ces Coléoptères, ainsi que les Trogosités et les Prostomis" (*Megagnathus*), se rapprochent sous quelques rapports des Lucanides." The chief of these "rapports" appear to me to consist in the pentamerous tarsi and general character and habits of the insects; and in the formation of the labium and maxillæ of *Rhysodes*, as well as in the characters of *Passandra*, other and much greater resemblances are discoverable.

In the new edition of the *Règne Animal*, Vol. V. p. 101, Latreille has, however, altered the situation of the genus *Passandra*, and has included it in his third division of the *Xylophages*, placing it as the last genus after the *Trogositarii*, with the remark, "Ces insectes sont évidemment le passage de cette famille (Trogositæ) à la suivante (*Cucuj* or *Platysomes*). Ils ne diffèrent même des *Platysomes* que par leurs antennes." It is evident that Latreille here alludes to the increased size of the last joint of the latter organs, fig. 3, C. In every other respect, not only in general formation, but also in the similarity of structure of the under side of the head, (which I have figured in TAB. SUPP. XLVI. fig. 3, A,) it will be perceived, that a most intimate connexion exists between this genus and the two preceding, and the description of the trophi given by Dalman tends to confirm this affinity. If Latreille, however, was anxious to shew the affinity between his *Trogositarii* and *Cucujipes*, there are other and much more satisfactory links (as I shall subsequently endeavour to prove) to establish the connexion, than the mere incrassation

of the terminal joint of the antennæ. It will also be seen, (notwithstanding Dalman expressly says, "Tarsi omnes exactè 4-articulati, absque "rudimento nodi basilaris in articulo unguiculari, subtùs ciliati non vero "spongiosi,") from the fig. 3, D, that there is a rudimental basal joint in these organs which will also further exhibit their affinity with the genus *Catogenus*. Dalman was evidently led into this error from an idea that if any rudimental joint actually existed it would be the fourth, as in *Parandra* and the *Longicornes*, and not the basal joint.

Of this genus there are four species contained in the cabinet of the British Museum; and Messrs. Hope and Children have respectively specimens of another species, which the former gentleman received from Dr. Klug, under the name of *Pass. vittata*.

The species all agree in being less depressed than either *Cucujus* or *Catogenus*, and also in having the elytra but partially striated, the disk of each being smooth and shining.

The next genus to which I beg to call the student's attention is that of

DENDROPHAGUS, Gyll.,

chiefly on account of its approaching the preceding genera not only in its elongate form but also in having the "tarsorum articulus primus minus, inferus," Gyll.

As Gyllenhal has not stated that the underside of the head of this genus is produced as in the preceding, we may conclude that it is formed as in the subsequent genera.* Still if we notice the similarity in the structure of the trophi themselves, (especially the maxillæ and maxillary palpi, and the labium and its appendages,) in *Catogenus*, *Uleiota* and *Cucujus*, we shall soon be convinced of the real approximation between the genera, notwithstanding the variation in the structure of the underside of the head.

The type of the genus *Dendrophagus* is the European species, *crenatus*; but the British Museum cabinet contains three species (arranged under *Brontes*,) one of which is a remarkable insect.

Although differing in its elongated form and shorter antennæ, yet in the majority of its characters, and more especially in the formation of

* See Note B.

the trophi as described by Gyllenhal, Ins. Suec. 2, p. xiv., this genus most nearly approximates to

ULEIOTA, Latr. (*Brontes*, Fabr.)

the type of which is the *Br. flavipes* of Fabricius. This genus is characterized by the length of its antennæ, (the second joint of which is inserted upon the side rather than the apex of the preceding joint, Tab. Supp. XLVI, fig. 4, A), the acuteness of the last joint of its palpi (Ibid. D. & E.), and its labium, which is merely emarginate in front, E. The male of the typical species presents a remarkable character in having the outer side of the mandibles armed with a strong bent hornlike process considerably advanced in front of those organs, (Ibid. C.). I do not find, from the description of this species, that the antennæ of the female are shorter than those of the male; had they been so, Latreille would doubtless have mentioned the circumstance.

To this genus evidently belongs an insect, considerably larger than the *Ul. flavipes*, brought by Dr. Horsfield from Java, and now contained in the Museum of the East India Company. Mr. Hope also possesses the same species from New South Wales. The British Museum Cabinet contains another species allied to *Ul. flavipes*.

It will not be considered necessary for me further to mention the obvious affinity between the last genus and

CUCURUS, Fab.,

which, as a genus, is characterized by Latreille by the comparative shortness of its moniliform antennæ (Tab. Supp. XLVI, fig. 5, A.), depressed body, truncate palpi (Ibid. D. and E.), and bifid labium (Ibid. E.) Such, indeed, are the characters presented by the large typical species, *Cuc. depressus* (*sanguinolentus*, Linn.,) and *clavipes*; but the genus, as at present constituted, comprises several distinct forms, to some of which I propose to advert.

There is, however, another character connected with the typical species, namely, the real formation of the *tarsi*, which has escaped the notice of Latreille, notwithstanding he has, in the first edition of the *Règne Animal*, expressly characterized the *tarsi* as having all the joints entire, whilst, as belonging to insects placed by him in his division *Tetramera*, it is evident that he must have regarded them as only four-jointed.

The accurate examinations and descriptions of Gyllenhal throw, however, some light upon the formation of these organs, and accordingly we find the following observation in the Addenda to the first volume of the *Insecta Suec.*, Vol. II. p. 6, (misprinted 4.) “Secundum observationes “Cl. Dom. Schönherr, in Act. Holm. 1809. pag. 52, et sequ. plurimæ “species Generis Cucuji tarsos gerunt omnes 5-articulatos, ideoque heic “[Pentamera] inseratur Familia 9-10: ma Cucujipes.” This reference being unfortunately incorrect, I have not been able to make that use of Schönherr’s observations which I could have wished; and in the characters which Gyllenhal has given of the genus, we find “Tarsuum articulus “primus minutus inferus stipuliformis,” with the additional observation upon *Cuc. depressus*, “In altero sexu, forte masculo, tarsi postici tantum “4-articulati, primo minuto stipuliformi, secundo elongato cylindrico, “tertio brevi sub-bilobo, quarto unguiculari longo clavato.”

In my specimen of *Cuc. depressus* the joints of the *tarsi* are exactly as represented in fig. 5, F, G and H. Regarding, therefore, the last observation of Gyllenhal to be correct, we are led to consider that in all other respects a similar formation of organs (including, of course, the *antennæ*) is observed in the sexes, since, if this had not been the case, Gyllenhal would most certainly have apprized us of the differences. The comparative smallness of the second joint, and the very slight incrassation of the last three joints of the *antennæ* of this species will be perceived in fig. 5, A.

In the British species *Cuc. dermestoides*, which is well figured by Panzer, 3, B, there are several peculiarities of formation, which distinguish it from *Cuc. depressus*. In shape it is more oblong. The hinder angles of the head are not so much produced. Its *antennæ* are shorter, with the second joint nearly as large as the third, the eighth small, and the three following incrassated, (Tab Supp. XLVI, fig. 6, A.) The *mentum* is different, the anterior margin being pointed in the middle (Ibid. E.), and the last joint of the maxillary and labial *palpi*, although truncate at the tips, is not obconic (Ibid. C. and D.) According to Gyllenhal, however, the posterior *tarsi* vary according to the sex, as in *Cuc. depressus*, and as no other variation is noticed by that author, we may conclude that the *antennæ* do not vary in the sexes. Upon the affinities of this insect Gyllenhal observes, “Antennarum et scutelli structura, ut et articularum

“ tarsuum variatio secundum sexum, affinitatem cum Genere Cryptophagi
 “ produnt, sed instrumenta cibaria, et statura corporis deplanata, bene
 “ distinguunt.”

Cucujus muticus, Fab., appears to agree with the preceding in the formation of its essential organs, although the sides of the *thorax* are not denticulated. In another small British species, (Tab. Supp. XLVII. fig. 1.), nearly allied to the *Cuc. dermestoides*, (which Mr. Stephens has named in his Catalogue, *Cuc. testaceus*, Pk., Fab., and Gyll., but which appears to me rather to be the *Cuc. piceus*, Oliv. and Latr. Hist. Nat. 11, 256, 4.) the *antennæ* are formed as in *Cuc. dermestoides*, the *labrum* is, however, much larger than in that species, and semicircular (Ibid. fig. 1, A.), and the terminal joint of all the *palpi* is but very slightly truncate, being almost acute (Ibid. C. and D.), the *labium* is entire (D.) This species (which I received from Mr. Ingpen, who procured it from the decayed part of an old elm-tree, in Wiltshire, in the month of December,) although agreeing with Gyllenhal's description of the form of the head, antennæ, and form and striation of the elytra of *Cuc. testaceus*, appears to be too darkly coloured for the description of that species, being *rufo-castaneous* rather than *rufo-testaceous*, and Gyllenhal says of the thorax of *Cuc. testaceus*, “ sub-quadratus—angulis posticis parum pro-
 “ minulis,” whereas in my insect, the sides of the thorax are slightly denticulated at the base, although agreeing in other respects with Gyllenhal's description.

In the breadth of its body and in its more developed *labrum*, the *Cucujus monilis*, Fab., Pk., and Gyll., (*Cuc. bipustulatus*, Hellw., Latr., Pz., *Cuc. bimaculatus*, Oliv., Latr.,) appears to recede from the typical form of the genus. In the specimens which I have seen of this insect, the *antennæ* have the last three joints thickened; they therefore appear to be the var. a. of this species, described by Gyllenhal; but I very much question whether they are, as he supposes, males, since, notwithstanding its greater size, I should be induced to regard his var. b, “ antennis filiformibus, di-
 “ midio corpore longioribus—articulis ultimis non crassioribus, sed elon-
 “ gatis cylindricis,” as the male of the species.

In the Exotic Cabinet of the British Museum, are several specimens of a small pale testaceous species, with the *thorax* subquadrate, named by Dr. Leach, “ *Cucujus monilis*, H. testaceus, Pk.” This is a British spe-

cies, and has been taken by Mr. Stephens, as well as received by him from Mr. Griffin. It is not, however, contained in his Systematic Catalogue. The specimens, although agreeing in size, vary (as in the last species) in the formation of the *antennæ*, which in some individuals (most probably males) are very long, slender, and filiform,* whilst in others they are much shorter, with the three apical joints incrassated. These last I conceive to be females.

Of a similar formation with the latter specimens are two insects contained in the cabinet of Mr. Stephens, and in his Systematic Catalogue named "*Uleiota monilicornis*, Marsh. MSS." The *Brontes pallens* of Fabricius (which Mr. Stephens doubtfully regards as a synonym of this species) is, however, considered by the German and French entomologists as a variety of *Ul. flavipes*, and consequently a much larger insect.

The remaining insect of this genus which I shall mention, is a small pale fulvo-testaceous species (Tab. Supp. XLVII. fig. 2.), which was captured under the bark of a Horn-beam tree, in Hainault Forest, by Mr. Bydder, and which is now in my cabinet; I am not aware of any other British specimen, nor do I find it described, unless it be the *Cuc. unifasciatus* of Latreille, (Hist. Nat. 11, 256.) The head is as large as the *thorax*, and has several emarginations on its anterior margin; the *labrum* is large, and rounded in front (Ibid. fig. 3, A.), the *antennæ* are longer than the head and *thorax* (Ibid. E.), the first joint larger than the second, which is also a little larger than the third, the remaining joints gradually increase in length and thickness to the last joint, which is as large as the basal joint, and acute at the tip. The *trophæ* (Ibid. B, C, and D,) considerably resemble those of the Wiltshire species, *Cuc. piceus*?. The *thorax* is almost quadrate, with a very fine depressed line running parallel with each lateral margin, which is entire: it is very slightly narrower behind than in front. The *elytra* are not broader, but about twice the length of the *thorax*, with several rows of minute punctures, which are more distinct near the *apex*; there is also a deeper stria near the lateral and sutural

* The insect specifically named *testaceus* by Fabricius, was placed by him in his genus *Brontes*, and as the supposed males of the specimens above mentioned have long *antennæ* (as in that genus), I am induced to consider that they, and not the Wiltshire specimens, are the true *testaceus*.

margin of each, and they are deflexed at the sides; also in the centre of each, there is an obscurely defined brown spot.

Such are the characters of several of the insects comprised in the genus *Cucujus*; and while on the one hand their affinity to *Uleiota*, *Dendrophagus*, &c. is evident, their relationship with the *Trogositarii* is no less intimate on the other, whether we regard the general habit, or the prevalent structure of the trophi and other essential organs. Thus if the incrassation of the terminal joints of the antennæ be considered a characteristic of the latter family, we find several of the smaller *Cucuji* exhibiting the same structure. If we compare the dissections of *Trogosita* given by Sturm, in his *Deutschland's Fauna*, with those of *Uleiota* and *Cucujus*, but little general variation will be perceived, and even in respect to the formation of the *tarsi*, we find Gyllenhal (*Ins. Suec.*, 1, 73,) describing them in *Trogosita* as being all five-jointed, “*articulo primo parvo retracto, præsertim in posticis.*” We also find, at the same place, the following interesting observation. “*Antennarum articulis extimis majoribus, uno latere productis, ut et statura corporis, aliquatenus ad Platyceros accedit hoc genus; proprie tamen pectinatæ dici nequeunt antennæ; apud D. Latreille, una cum genere exotico, Parandra dicto, peculiarem constituit familiam, cui nomen “Trogositariorum” addidit. Species duæ aliæ Suecanæ, a D. Paykull huc relatæ, ad sectionem secundam, tarsis posticis 4-articulatis, pertinent.*”

We subsequently, however, find Gyllenhal inclined to doubt the affinity of *Trogosita* with the *Lucanidæ*; and the situation in which he proposes in his second volume to place it, is the family *Cucujipæ*, thus at once establishing the affinity; “*Genus Trogosita forte aptius in hac familia collocandum, quam apud Lucanideos.*”

Mr. Stephens also, in his *Systematic Catalogue*, places it in the family *Cucujidæ*, but far removed from the remainder of Latreille's *Xylophagi*. Although the opinion of the latter author upon the affinity of the *Cucujipæ* with the *Trogositarii*, may be seen in the following observations upon the former family, which he says “*se rapproche de la précédente*” (*Trogositarii* amongst the *Xylophagi*) “*quant à l'anatomie intérieure, aux tarses, dont les articles sont tous entiers, et quant aux habitudes,*”*

* *Règne Animal*, 2nd edition; Vol. V, p. 101.

yet that author has always regarded *Trogosita* as forming, with other genera, a portion of his artificial group *Xylophagi*; indeed, of the propriety of, at least, considering (with Latreille) *Trogosita* as the type of a group of genera, (although we may perhaps doubt its affinity with many other of his *Xylophagi*,) the student will be at once convinced, on comparing the figures of the *trophæ* of *Trogosita* and *Megagnathus* given by Sturm, and Mr. Curtis's dissections of *Cicones* and *Bitoma*; to which latter genera I may add, from actual dissection, *Synchita*, *Cerylon*, *Rhyzophagus*, *Monotoma*, *Nemosoma*, and probably *Lyctus*.*

Perhaps the singular genus

MEGAGNATHUS

ought to be considered as the stepping-stone between the two families, since in many important respects it appears to be allied to the insect considered above as the *Cucujus unifasciatus*; and we find the *maxillæ* of this genus (which is admirably figured, with its dissections, by Sturm, in his *Deutschland's Fauna*) furnished with two processes, as in *Cucujus*, although the interior one is not unguiform as in some of the species of that genus. The parts of the mouth are, however, considerably more elongated. There is a portion of the structure of this insect, which it is somewhat singular Sturm should have omitted to figure, namely, the extraordinary prolongation of the under sides of the head, (Tab. Supp. XLVII. fig. 4.) which is evidently a modification of the formation of the same parts in *Catogenus* and *Passandra*. The last three joints of the *antennæ* of *Megagnathus* are rather larger than the others.

TROGOSITA,

as at present constituted, (like *Cucujus*,) comprises several distinct formations. Thus, in *Tr. Caraboides*, the joints of the *antennæ* gradually increase in size to the tips; the mandibles are trigonate and notched at the apex, the *maxillæ* are furnished with a single process,† the *labium* is nearly quadrate, and with the front margin entire. I have already no-

* See Note D.

† I say a single process, because the inner one appears to be only rudimental, "Basilari et interno saltem minimo, vix distinguendo, non prominulo," Latr. Gen. Cr. &c., Vol. III. p. 22, Note.

ticed the formation of the *tarsi* of this species. Again in *Trogosita virescens*, *cærulea*, and *ænea*, which are proportionably much longer insects, and which, as their names import, are much more brilliantly coloured than the rest of the genus, the head is almost square, with three emarginations in front (Tab. Supp. XLVII. fig. 6.), the *labrum* is transverse, and slightly emarginated in front (Ibid. fig. 6.), the jaws are long, exserted, and acute at the tips (Ibid. fig. 6.), the last three joints of the *antennæ* are much larger than the preceding (Ibid. fig. 6.), the *maxillæ* are long, and with one process only (Ibid. fig. 5, B.), the last joint of the maxillary *palpi* is nearly cylindric, and transversely truncate (Ibid. B.), the *mentum* is formed as in *Trogosita Mauritanica*, the *labium* is long, and its anterior half is divided into two divaricating lobes, which are ciliated, (Ibid. C.) The *palpi* are three-jointed, and affixed to long scapes united together, and their terminal joint is truncate, (Ibid. fig. 5, C.) The margins of the *thorax* are slightly notched in the centre, (Ibid. fig. 6.) the legs are longer than in *Tr. Mauritanica*, and the *tarsi* are only four-jointed, the three basal joints equally short, and the last joint as long as the three preceding, with a short style furnished at the tip with two diverging bristles between the two strong claws, (Ibid. E. and F.) These characters will, I have no doubt, be considered sufficiently strong to warrant my proposing the establishment of the insects exhibiting them, into a distinct genus, which I propose to name, from the divided *labium*,

TEMNOSCHEILA.*

In addition to the preceding, I have noticed several other forms of *Trogosita* in the cabinets of our entomologists, especially in that of the Rev. Mr. Hope.

In order to render this paper as complete as possible, I now beg leave to add a few remarks upon the two remaining genera, which have been occasionally considered to belong to the family *Cucujidæ*, namely, *Parandra* and *Hemipeplus*. The observations which I shall have occasion to quote upon the genus

PARANDRA, Latr. (*Isocerus*, Illiger.)

will perhaps be thought more generally interesting than any of the preceding, in consequence of their shewing to us the recorded opinion of

* *Τεμνο* scindo et *χείλος* labium.

Latreille upon the tarsal system, which we have been taught to consider as regarded by that distinguished entomologist as a perfectly natural one.

The genus was established in the *Histoire Naturelle*, &c. Vol. XI, p. 252, and inserted in the family *Cucujipes*, and the following extract will assist the student, not only in acquiring a knowledge of some of its peculiar characters, but also in noticing the first arguments of Latreille in favour of its situation amongst the *Tetramera*, “Parandra. La seule espèce connue de ce genre ressemble singulièrement, au premier coup d’œil, à un Lucane, soit par la forme du corps, soit par l’avancement des mandibules. La même analogie se retrouve aussi dans d’autres parties de la bouche, telles que les mâchoires qui sont également allongées et linéaires; mais la Parandre lisse n’a que quatre articles aux tarses et ses antennes sont filiformes et entièrement grenues. L’avant dernier article de ces insectes est un peu bifide, pour recevoir un petit renflement qui est à la base du dernier. Ce renflement semble former un petit article, et c’est ce qui en a imposé à De Geer qui lui en a donné cinq; les Capricornes ont leur dernière pièce des tarses conformée de la même manière et cependant, de l’aveu de tous les entomologistes, ces insectes n’ont que quatre pièces à ces parties. La forme de ce dernier article des tarses des Parandres, leurs palpes filiformes, la saillie de leurs mandibules, leur corps assez épais quoique déprimé, sont des caractères qui éloignent ce genre de ceux de Cucuje et d’Uléiote de la même famille.”

In the “*Genera Custaceorum*,” &c. Vol. III. p. 26, we find the following note at the foot of the *Cucujipes*, “Genus nostrum Parandra familiæ sequenti inscribam,” and the genus is then described at p. 28, amongst the *Prionii*, with the following “Observatio. Instrumentis cibariis genus Lucanis affine, habitu vero et antennis Trogositis, Cucujis, Prioniiis, proximum. Forsan per Xylophagos Cucujipes ad Prioniorum familiam transeundum, deinde a Cerambycinis ad Chrysomelinas; subsequerentur Erotylenæ, Coccinellidæ, Diaperiales, Pimeliariæ; Rhynchophori in extremo positi Coleopteris fines statuerent.”

In the *Considerations Generales*, p. 228, the first edition of the *Règne Animal*, Vol. III. p. 339, and the *Familles Naturelles*, p. 398, the genus is again inserted in the *Cucujipes*, but in the new edition of the *Règne Animal* we find it forming the first of the *Prionii* (the first tribe of

the family *Longicornes*) and among the characters given of this family we find, "le dessous des trois premiers articles des tarses garni de brosses, les second et troisième en cœur, le quatrième profondement bilobé,* et un petit renflement ou nodule, simulant un article, à l'origine du dernier;" with the following note upon this last character, "Les parandres ressemblent parfaitement, sous ce rapport, aux longicornes, et si l'on considérât ce petit nœud comme un véritable article, non seulement cette famille, mais la suivante, appartiendraient à la section des pentamères. Il peut bien représenter le quatrième article de ceux-ci; mais, attendu qu'il n'a point de mouvement propre, il est censé faire partie du suivant." The characters of the family also include "La languette (labium), portée par un menton court et transversal, est ordinairement membraneuse en forme de cœur, échancrée ou bifide, cornée et en segment de cercle très court et transversal dans d'autres (Parandrie)".

In the characters which he has given of the genus, after pointing out the resemblances between it and the *Prionii*, we notice the following distinguishing characters, "Languette cornée, en forme de segment de cercle très court, transversal, sans échancrure ni lobes," and "Tarses, dont le pénultième article légèrement bilobé, et dont le dernier, notablement plus long que les précédents pris ensemble, offre, entre ses crochets, un petit appendice, avec deux soies au bout."†

This last character is an interesting one, since it is also found considerably developed in the *Lucanidæ*. It may also be observed in a very minute state in *Cucujus depressus*, and in *Spondylis buprestoides* (which Latreille has overlooked, Règne Animal, Vol. V. p. 106, &c.) but not in *Prionus coriarius*, although there is a very minute rudimentary lobe between its claws. But there are other characters than those noticed as above by Latreille, either separating this genus from the *Prionidæ*, or shewing its approach to the *Lucanidæ*. The body is smooth and polished, the first three joints of the *tarsi* are cylindric, and not clothed beneath with "brosses," having only a few hairs scattered over them (Tab. Supp.

* Latreille has here evidently fallen into an error, the first and second joints being "en cœur," and the third "profondement bilobé."

† See Note E.

XLVII. fig. 7, D.), the third joint being but slightly bilobed. The *mentum* is very short, and transversely linear, and completely concealing the *labium* and *maxillæ*, which are densely clothed with hair in front, (Ibid. A.) The species are peculiar to America.

Still, however, the general, as well as essential, characters of the genus approach so near to those of *Spondylis*, (Tab. Supp. XLVII. fig. 8, A B C D E and F,) that we cannot regard the latter otherwise than as the connecting link between *Parandra* and *Prionus*, and that the situation given by Latreille, in his last work, to these genera, is the correct one. How are we, however, to regard all these resemblances between this genus as well as some of the preceding and *Lucanus*? are they not too striking and important to be considered merely as analogies? and would it be unnatural to regard this genus as the osculant one between *Lucanus* among the *Lamellicornes*, and *Spondylis* and *Prionus* amongst the *Longicornes*? we find the two great groups similar in their herbivorous habits, and also similar in comprizing the giants of the order to which they belong.*

HEMPEPLUS, Latr.

appears to have been first noticed, without any characters, in the *Familles Naturelles*, where it was placed as the last genus in the family *Cucujidæ*. In the second edition of the *Règne Animal*, Vol. V. p. 53, however, we find the genus removed, and doubtfully placed in the *Lagriaire*s. The characters are there detailed, which appear to be very singular. The genus is established, "Sur un insecte trouvé en Écosse, dans "une boutique," forwarded to Latreille by Dr. Leach.

Description of the Figures.

TAB. SUPP. XLVI.

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| Fig. 1. <i>Rhysodes exaratus</i> , highly magnified, the natural length indicated by the line at the side. | showing the large mentum, and the situation of the eyes. |
| A. The under side of the head | B. The labrum. |
| | C. The mandible. |

* See Note C.

D. The maxilla and palpus.

E. The labium and palpi.

F. The cubitus, or anterior tibia and anterior tarsus, seen from above.

G. The same seen from below. Fig. 4.

H. The same seen from the side.

I. The posterior leg.

K. Part of ditto, shewing the excavated tip of the femur.

L. The same seen from within.

M. The apex of the hind tibia and tarsus. Fig. 5.

N. Under side of the trunk.

Fig. 2. *Catogenus rufus*.

A. The head seen from above, with one mandible opened to shew its formation.

B. The same seen from below.

C. The clypeus and labrum.

D. The maxilla and palpus.

E. The mentum, labium, and palpi seen from beneath.

F. The same seen from within.

G. The base of one of the elytra.

H. One of the legs.

I. The base of the thorax.

Fig. 3. Details of *Passandra vittata*.

A. The under side of the head.

B. The tip of the maxillary palpus.

C. The last two joints of the antenna.

D. The tip of the tibia and tarsus.

Fig. 4. Details of *Uleiota flavipes* ♂.

A. The head seen from beneath.

B. The clypeus and labrum.

C. The mandible.

D. The maxilla and palpus.

E. The mentum, labium, and palpi.

F. One of the tarsi.

Fig. 5. Details of *Cucujus depressus*.

A. The head and thorax from above.

B. The head from beneath.

C. The clypeus and labrum.

D. The maxilla and palpus.

E. The mentum, labium, and palpi.

F. The anterior tarsus.

G. The posterior ditto.

H. The claws and style.

Fig. 6. Details of *Cucujus dermestoides*.

A. The head seen from below.

B. The clypeus, labrum, and mandibles.

C. The maxillary palpus.

D. The last joint of the labial palpus.

E. The mentum.

F. One of the tarsi.

TAB. SUPP. XLVII.

Fig. 1. *Cucujus piceus* ? magnified.

A. The labrum.

B. The mandible.

C. The maxilla and palpus.

D. The labium and palpi (mentum not satisfactorily examined.)

- Fig. 2. *Cucujus unifasciatus*? magnified.
- Fig. 3. Details of ditto.
 A. The labrum.
 B. The mandible.
 C. The maxilla and palpus.
 D. The labium and palpus seen from within.
 E. The antenna.
 F. The leg.
- Fig. 4. Under side of the head of *Megagnathus mandibularis*, greatly magnified.
- Fig. 5. *Temnoscheila ænea*.
 A. The underside of the head.
 B. The maxilla and palpus.
 C. The mentum, labium and palpi.
 D. The under side of the trunk.
 E. The tarsus.
 F. The claws and style.
- Fig. 6. The head and thorax of ditto, seen from above.
- Fig. 7. Details of *Parandra*.
 A. The under side of the head.
 B. The maxillary palpus.
 C. The labial palpus.
 D. The tarsus.
- Fig. 8. Details of *Spondylis Buprestoides*.
 A. The under side of the head.
 B. The maxilla.
 C. The mentum, labium, and one of the labial palpi (the other removed) to shew the situation of the maxilla and palpus.
 D. The tarsus seen from above.
 E. The same seen sideways.
 F. The last three joints of ditto more highly magnified.

NOTE A.

I find that Ahrens has figured an apparently distinct species of the genus *Rhysodes*, (under the name of *Rh. Europæus*,) in his Faun. Ins. Eur. fasc. 6, f. 1. In consequence of this work being of considerable rarity, and the figures but indifferently executed, I have not thought it necessary to suppress my figure.

Gyllenhal mentions the *Rhys. exaratus* in the Appendix to the 3rd Vol. of his *Insecta Suecica*, p. 720, "quod forte proprii generis, Cucujis quodammodo affine," and considers the *Ips monilis* of Olivier to be congeneric. In the 4th Volume of the same work, p. 332, he has described the insect, and states that the *palpi* are all filiform, "articulo ultimo elongato lanceolato," and that the *maxillæ* are "brevissimæ, apice setosæ."

NOTE B.

Having examined the structure of the under side of the head of a specimen of *Dendrophagus crenatus*, recently received from Germany, I find that it very nearly resembles that of *Uleiota flavipes*. The anterior *tarsi* exhibit the rudiment of a basal joint.

The genus was established by Schönherr in the Kongl. Vetensk. nya Acad. Handl. for 1809; and in the same paper, (which is written in Swedish and consequently unintelligible to me,) are contained his observations upon the structure of the tarsi of the *Cucuji*.

NOTE C.

Since the preceding observations upon a supposed connexion between the *Lucanidæ* and *Prionidæ* were penned, I have casually examined a most interesting insect, contained in the Rafflesian cabinet, which serves most satisfactorily to connect the two families. Its general appearance is that of a *Prionus*, with short trigonate advanced *mandibles*, and moderately long *antennæ*; but the latter, on a closer examination, are decidedly those of one of the *Lucanidæ*, the basal joint is scarcely longer than the third, and a slight elbowing of the *antennæ* is observed at the second joint, the last three joints are not longer than the preceding joints, and very slightly produced on the inside, giving these organs the appearance of being almost setaceous. The joints of the *tarsi* are cylindric, but the insect is heteromerous!

NOTE D.

In addition to the affinities of the *Cucujidæ* mentioned above, I have endeavoured to prove, in a paper upon the singular family *Paussidæ*, which I have presented to the Linnean Society, that the former family may perhaps be considered as having the greatest affinity with the *Paussidæ*, particularly when we notice the depressed bodies, the formation of the *antennæ*, and especially the pentamerous, or rather subpentamerous, *tarsi* of several of the genera in each family. It is by means of such genera as *Rhysodes*, *Clinidium*, *Catogenus*, &c., that I consider the connexion may be traced, although many links remain to be discovered.

NOTE E.

There is a valuable paper, by Gyllenhal, upon the genus *Parandra*, Latr., inserted in the Kongl. Vetensk. nya Acad. Handl. for 1817, in which the author has noticed the structure of the tarsi in the insects included in it, and has described four species.

238 Mr. Collie on the *Natural History of the Kangaroo.*

ART. XXXIV. *On some particulars connected with the Natural History of the Kangaroo.* By A. COLLIE, Esq., F.L.S., Corr. Memb. Z. S. In a Letter to N. A. VIGORS, Esq., F.R.S., F.L.S., &c., Sec. Z. S.

H. M. Sloop Sulphur,
Cockburn Sound, Western Australia,
26th January, 1830.

My dear Sir,

As so much has recently been done to illustrate the history of the very peculiar mode of generation in the Kangaroo, the following observations on this subject may not be unacceptable: I had not the pleasure of seeing Mr. Morgan's paper before leaving England, and I therefore do not know precisely how far these observations will be found to coincide with his.

Buache, or Garden Island, which forms the best side of Cockburn, is covered, in addition to its trees, with a thick underwood and low shrubs, which are penetrated with some difficulty. Among these, a small species of Kangaroo, perhaps the *Didelphis Brunii* of Gmelin, and what is said to be the Wallabee or Bush Kangaroo of Sydney, is found in very great numbers. The males weigh about 14lbs., and the females considerably less. It is brownish above, and greyish beneath.

In the months of July and August last, I had an opportunity of seeing several females with their young (one to each) of that season, so far advanced as to be nearly in a state fit for living independent of the mother. They were nearly half the height and length of the mother, and tolerably covered with hair. One teat only of the four was in any instance enlarged, and it was only at the base of this that the lacteal gland could be felt.

From that time to the present, I have occasionally looked at the abdominal sac, and found it empty, dry, and exceedingly contracted, with, however, the enlarged papilla and very perceptible gland at its base, the former certainly much shortened, and the latter a little diminished. More recently, my attention was very closely directed to this subject, and on the 23rd instant, I was informed, to my no small delight, that a Kangaroo

had been caught with its little young in the sac at the teat. This young one, which has not obviously increased since, is of nearly the size of the last and half the middle joint of one's little finger; its integuments of a flesh colour, and so transparent as to permit the higher coloured vessels and viscera to shine through them; whilst all its extremities seem completely formed, and its muscular power is fully testified by its evident efforts in sucking, during which it puts every part of its body into action. According to the testimony of the person who preserved the mother with this little one for me, the latter by no means passes the whole of its time with the lacteal papilla in its mouth, but has been remarked, more than once, without having hold of it. It has even been wholly removed from the sac to the person's hand, and has always attached itself anew to the teat. Yesterday, on again looking at it, I gently pressed, with the tip of my finger, the head of the little one away from the teat of which it had hold, and continued pressing a little more strongly for the space of a minute altogether, when the teat that had been stretched to more than an inch, came out of the young one's mouth, and shewed a small circular enlargement at its tip, well adapting it for being retained by the mouth of the sucker. The opening of the mouth seemed closed in on both sides, and only sufficiently open in front to admit the slender papilla. After this I placed the extremity of the teat close to the mouth of the young, and held it there for a short time without perceiving any decided effort to get hold of it anew, when I allowed the sac to close and put the mother into her place of security. An hour afterwards the young was observed still unattached, but in about two hours it had hold of the teat and was actively employed sucking. On examining the sac of another Kangaroo I found a still smaller young one in it than the preceding. This one is about one half larger than the body of the common Wasp, (*Vespa vulgaris*). Its extremities, even to its toes, are evidently developed, and its skin is still more transparent than the before mentioned. The papilla to which it is attached, and from which its body hangs suspended without any other support than the hold which it has of the papilla, (a position into which I purposely placed it,) is, like the young, delicate, smooth and purplish, exhibiting a high degree of vascularity, and is about $\frac{7}{16}$ of an inch long. The gland, however, at its base is very little enlarged, so little indeed as to be scarcely perceptible; whilst that at the base of another papilla which

is larger than this one, of a pale unvascular appearance, and circularly corrugated, is large and firm. This appears to be the teat and gland which afforded the milk to the young of last season, not yet restored to its wonted size.

An officer of H. M. S. Success at present here, observed a Kangaroo in the act of parturition. When the foetus was expelled from the vagina per anum, the mother was lying partly on one side and partly on her back, resting against the side of the cage where she was confined. She kept her hind legs apart, and the very diminutive young, when brought forth, crept among the fur of the mother towards her belly and towards the opening of the abdominal pouch; whilst she, with her head turned towards her tender offspring, seemed to watch its progress, which was about as expeditious as that of a snail. After it had made some advance, my informant, unconscious of the remarkable œconomy of generation in this class of Quadrupeds, removed the newly born animal before it had reached its destination, which must have been the mouth of the sac. The parturition took place two days ago.

I have just now procured two gravid uteri in which the foetuses seem to be arrived at, or very near to, the termination of the period of gestation. One of them, which is about the size of the smallest young already mentioned as being in the abdominal sac, has protruded through an opening inadvertently made in the uterus, and is distinctly seen through its transparent membranes and the liquor amnii.

Another Kangaroo was caught three days ago with a young one twice the size of the largest I have described, but on going to see it on the 25th the young was dead, lying in the sac unattached to any teat.

The eyes of these three are covered, or perhaps I ought rather to say, the eyelids are united by an opaque whitish membrane. The nostrils, however, even of the smallest are very evidently perforated for the purpose, it would seem, of admitting air to the lungs whilst the mouth is closely embracing the teat. To see how closely the sac embraces the young, that is sometimes retired deep in its bottom, one would be apt to think that even the little air that so small an animal requires, could scarcely reach it unless by some peculiar mechanism.

At a future period I hope to be able to communicate more positive information on this subject, and to transmit or bring you something

worthy of your so useful Society. Unless the Sulphur moves to some other part of New Holland, I fear I shall add little to your Australian Ornithology.

Believe me, &c. &c.

A. COLLIE.

ART. XXXV. *Analytical Notices of Books.*

Untersuchungen ueber die Bildung und Entwicklung des Flusskrebses:
von HEINRICH RATHKE. Mit 5 Kupfertafeln. Leipzig, 1829.
Fol. pp. 97.

Researches on the Formation and Developement of the Crawfish.

THE zoologists of this Country have been of late years so accustomed to direct their attention almost exclusively to animals in their perfect state, that to the greater number of our readers, the analysis of a work devoted to their illustration in the earliest stages of their developement will in all probability present an altogether novel subject of contemplation. It is for this reason especially incumbent on us to put on record some account of one of the most valuable contributions to animal physiology that we have met with for a considerable time. Any analysis of a work, chiefly remarkable for its minute details on the minutest objects, must necessarily be very imperfect; but we shall endeavour, as far as possible, to select its leading features, so as to give a general, if not a complete, idea of its contents.

While the comparative anatomists of France and England have been for the most part content to follow in the beaten track of observation, those of Germany have been exploring a new path, in which they have already made discoveries of the highest importance, with the promise of a much more ample harvest for the future. In common with the philoso-

phical botanists of the day, they have become aware that the ovum, both before and after impregnation, undergoes a variety of changes hitherto quite unsuspected, and capable of throwing a new and valuable light, not only on many of the darkest points of physiology, but also on the complicated chain of natural affinities. They have consequently endeavoured to trace the the structure of the egg from its first formation in the ovary, through all its phases, to the complete developement of the animal to which it is destined to give birth; and thus to lay a firm foundation for the determination of the general laws of organic developement.

Among the most successful of these investigators, we may mention Herold and Von Baer, to the former of whom we owe an extensive series of observations on the the ova of Spiders, while the latter has devoted his attention more particularly to those of Vertebrated Animals. The present authour, Dr. Rathke, was stimulated by the work of Herold to follow in his footsteps, and to ascertain, by the examination of one of the higher order of Crustacea, to what extent its original structure and subsequent developement corresponded with the remarkable peculiarities observed in the nearly related tribe. For this purpose the common river Crawfish, (*Astacus fluviatilis*, Fab.,) appeared to offer a favourable object, on account of the large size of its eggs, the lengthened period of their developement, the transparency of their envelope, and the facility of procuring them at almost every season. The authour gives the result of his observations during the springs and summers of three successive years. These observations were not, however, made on the progeny of a single Crawfish, but on eggs taken successively from numberless individuals brought to the market of Dantzic from the same locality; their continuity therefore is not altogether complete. The magnifying instruments used were either a simple lens, or one of Fraunhofer's compound microscopes; but the latter could not have been frequently necessary, as by far the greater number of the accompanying figures are magnified only fifteen times in their diameter.

The authour divides his work into eight sections. In the first, he gives a general description of the sexual organs of the full grown Crawfish, which it is unnecessary here to repeat, those parts having been already well described and figured by Roesel and Suckow. He then proceeds to give an account of the formation of the ova, and the changes which they undergo

during their continuance in the ovarium and oviducts. The ovum first appears in the shape of a small, almost perfectly transparent, vesicle, rather lenticular than spherical, consisting of an extremely fine membrane, and apparently filled with a clear watery fluid. This vesicle afterwards becomes surrounded by a second, and seemingly a still finer one, the proper membrane of the vitellus. The first traces of the vitellus itself consist of a fluid, interposed between the two vesicles, in the first instance as transparent as that of the inner coat, but gradually becoming whitish, opaque, thick, and viscid, and simultaneously exhibiting a number of extremely small, snow-white, scattered granules. During this process, the outer envelope gradually enlarges, and from lenticular becomes spherical, but the inner remains nearly of the same size, and instead of occupying the central point of the other, as at the commencement, becomes excentric, and places itself almost in contact with the paries on one side, while it is at a considerable distance from the other. The ovum thus formed remains within the parietes of the ovary for somewhat more than half-a-year, during which time the constantly increasing fluid of the outer vesicle, or in other words, the vitellus, becomes more and more viscid, changes in colour successively to Isabella-yellow, orange, and brown, and is at last almost entirely converted into a mass of very small granules of various sizes, intimately adhering to each other by means of the small quantity of viscid fluid that remains.

But the last and most important change that takes place within the ovary, consists in the evanescence of the internal vesicle, and the production of the embryo. The authour has never been able to ascertain what becomes of the former; he has remarked it in mature ova in the month of November, but has failed to detect it in the ensuing March. He suspects therefore, as was previously conjectured by Von Baer with respect to the corresponding part in the ova of the higher animals, that the embryo is formed from the evolution of its contents. The latter, when it first becomes visible, appears like a light whitish cloud of indeterminate form, spread over a small portion of the vitellus, having some thickness in the middle, but becoming gradually thinner towards its edges. Up to this period of its developement the egg remains enclosed within the walls of the ovary, in which it forms for itself a cavity, and to which it is attached by means of the mucous coating that surrounds it. As it increases in size,

it projects inwards the inner lining of the ovary, which becomes gradually thinner, until at length it bursts, and the ovum is released from its confinement by a slow and gradual process of expulsion into the cavity of the ovary. Thence it is propelled by degrees into the oviduct, where it is surrounded by a layer of albuminous matter, inclosed within a double coat.

Passing in silence over the impregnation and expulsion of the ova, and their attachment to the undeveloped legs beneath the tail of the mother, the authour, in the second section, resumes his observations at the period immediately succeeding the latter process, and proceeds at once to describe the new laid egg, which consists of the six following parts. 1. The *Vitellus*; which occupies by far the largest portion, is of a brown colour, and consists of an aggregate of minute granules varying in diameter from $\frac{1}{100000}$ to $\frac{3}{100000}$ of a line. These granules seem to adhere together by their own power of cohesion, without the intervention of any fluid, and are of a highly viscid consistence, which may be rendered much firmer for examination by maceration in spirit of wine or diluted nitric acid, the former giving them the fixity of cheese, the latter exhibiting them in the shape of rays passing from the centre to the circumference. 2. The *Embryo*; which shortly after the attachment of the eggs beneath the tail of the mother, loses its original form, and spreads itself over the entire surface of the vitellus, in the shape of an exceedingly thin layer, irregularly reticulated, and of a marbled appearance. The authour has not been able to observe the passage from its former to its present state, but he thinks himself justified in assuming the identity of the two parts, which is confirmed by Herold's researches on the eggs of spiders, where a similar change takes place immediately after their expulsion. 3. The *Membrane of the Vitellus*; which incloses the two former parts, is highly transparent, perfectly smooth on both surfaces, and extremely thin, and is not lost, as in the chicken, during the developement of the embryo, but remains to be thrown off with the other membranes, when the latter quits its shell. 4. The *coriaceous coat*; which surrounds the last, is, like it, very transparent, but much thicker, highly elastic, and of an almost coriaceous texture; it is perfectly smooth on the whole of its inner surface, but only on one small portion of the outer. 5. Between the two last named coats, in the new-laid egg, there exists a cavity of some little extent, occupied by a

transparent watery fluid, which diminishes in quantity as the embryo advances in its growth, and at last vanishes altogether, the two coats coming into contact with each other; this the authour considers as *Albumen*.

6. The *outer coat*, by means of which the egg is attached to the processes of the tail. This is scarcely half as thick as the coriaceous coat, but on account of the inequalities of its surface is much less transparent, and adheres to the coriaceous coat in every part, excepting only in that smooth portion of the latter, which has just been noticed; in this place a minute cavity is formed between the two, which corresponds with the point of attachment between the ovum and the shell of its mother.

The third section treats of the further developement of the embryo up to the period of the appearance of distinct organs, or the changes which occur in it during the month of April. The first change that takes place is the formation of a considerable number of insulated greyish white spots, of an irregularly roundish or elliptical form, over the whole surface of the vitellus. These patches, each of which is from four to six times as large as the largest globules of the vitellus, are connected together by minute filaments of the net work, of which the greater part of the embryo was previously composed. By degrees they assume a chalky whiteness, with a brown central point and a well marked circumference, gradually diminishing in size and apparently also in number. After a time they again separate and the substance of the embryo is dispersed over the surface of the vitellus, forming where it is thickest a clouded appearance resembling a cirrus, and where it is thinner, appearing, under a strong magnifying power, very finely reticulated. Every thing seems now prepared for the re-appearance of a proper embryonal sacculus. The scattered substance of the embryo contracts itself towards a certain point of the vitellus, leaving the far greater portion of the latter entirely free. This point is either actually beneath the attachment of the egg to the shell of its mother, or in the immediate neighbourhood, and never on the opposite side. As the embryo contracts itself, it increases in thickness in the middle, and becomes more definite at its edges. In this discoidal form its longest diameter is about half the radius of the egg, its colour is nearly uniformly white, and its constituent particles appear to be converted into granules, about equal in size to the largest globules of the vitellus.

The embryonal sacculus, from the time of its formation, gradually, but slowly, increases in size by the assimilation of the plastic matter of the vitellus, and changes its form to that of a more or less irregular ellipsis. A depression appears in its centre, usually in the direction of its longest diameter, which at first assumes the shape of a small segment of a circle, or of a horseshoe, but in the course of a few days increases in length, and approximates its two extremities, which at length unite together. This depression passes more and more deeply into the substance of the embryo, and a corresponding elevation of the latter extends into the vitellus, from which it receives a continued supply of plastic matter. During its formation the enlargement of the embryo at its edges steadily proceeds, the latter remaining, however, thin and transparent, while those parts which surround the depression are thicker and opaque. After a time, the new growth at the edges puts on in two different places a clouded appearance, which rapidly increases, extending itself towards the entrance of the depression, and assuming an elliptical form. The two ellipses gradually approach each other, and at length form by their union a broad heart-shaped patch, the narrow end of which is in immediate apposition with the thickened portion surrounding the depression. The developement of the separate organs now commences. The antennæ, labrum, mandibles and abdomen, first make their appearance, and nearly at the same moment. The last named part takes its origin from the depression; but all the rest are produced from the surrounding parts of the embryonal sacculus, or, to speak more accurately, from the clouded heart-shaped patch. To avoid circumlocution the authour names the opaque portion, the central piece of the embryo, distinguishing the depression as its posterior, and the clouded patch as its anterior, half; while he denominates the transparent circumference, the marginal piece. By degrees the entrance of the depression is enlarged, and its cavity is exposed, and at the same time brought more nearly to the level of the other parts. There is now seen upon its surface a small umbilicated elevation, the rudiment of the future abdomen and tail. At the same time there appears on the anterior half of the central piece of the embryo, on each side of the middle line, a process directed backwards and outwards constituting the commencement of the mandible. Two other pairs of similar processes, the rudiments of antennæ, had previously become visible still more

anteriorly; and the labrum had also commenced its growth, in the shape of a flattish elevation with a darker margin, occupying the middle space between the foremost antennæ. No trace of nervous or vascular system could be detected during the whole of this period. The embryo, it should here be observed, has by this time extended itself over about one fourth part of the surface of the vitellus, but its thickness is still considerable.

In the second period of developement, treated of in the fourth section, which closes with the appearance of the heart, and occupies a space of about a fortnight, from the end of April to the middle of May, the increase in the size and number of parts proceeds with much greater rapidity. The central piece enlarges itself to such an extent as fully to equal one eighth part of the surface of the vitellus, and at the same time acquires a considerable thickness; while the marginal piece, still remaining extremely thin and perfectly transparent, extends itself over the whole remaining part of that organ, and uniting its opposite edges, forms, with the central piece, a new and supplementary envelope. The production of the remaining external organs is continued in the same direction, namely from before backwards; and the developement of those previously produced gradually proceeds. The rudimentary antennæ increase in length, become detached from the surface nearly to their bases, and have their extremities partially bisected by a notch. The mandibles also lengthen, and enlarge, but more particularly in their basal portion, which continues to be applied and attached to the common surface, after the separation of the rest. The labrum gradually recedes from its position between the anterior antennæ, and takes its station between the posterior; and a cavity is formed behind it, communicating with the commencement of the œsophagus, which now becomes partially visible on dissection. Of the new parts, the eyes are the first that make their appearance. Up to this period the anterior half of the central piece, which produces the organs hitherto named, and which must now be regarded as the head, forms by far the largest portion; but the relation in this respect is henceforward reversed, and the posterior half enlarges itself with much greater rapidity. The umbilicated process of the latter becomes lengthened into an apparent tail, which includes, however, both tail and abdomen; and the depression in its surface is converted into the

anus, in which the intestine, now occupying the entire cavity of the process terminates. At the same time the extremity of this caudal process is gradually bent forwards beneath the central part of the embryo, until it is brought nearly into contact with the labrum. The maxillæ now begin to shew themselves; first, the three anterior pairs, nearly in contact with each other, but at some little distance behind the mandibles; and afterwards the fourth and fifth pairs, the former arising from the spot where the hinder part of the body is bent upon the fore part, the latter from the portion which is bent upwards. In a short time, however, the posterior maxillæ are brought, by a change in the relative position of the parts, into the same level with the anterior. As their growth proceeds, the latter increase much more slowly than the former, so that at the close of this period the fifth pair are four or five times as large as the first, and so on in proportion with regard to the intermediate ones. Their extremities, as in the antennæ and mandibles, separate from the surface of the central piece, and gradually become lobed, the two anterior pairs having each two lobes, and the three posterior, three. A longitudinal sulcus and six transverse ones, the latter corresponding with the several pieces of the trophi, now become visible on the surface of the central piece.

Very shortly after the appearance of the hindermost pair of maxillæ, the five pairs of true legs are produced in regular succession from before backwards, on that portion of the tail-like appendage, which is turned upwards. Each of these, in its early stage of development, is exactly similar to the hindermost maxillæ. Soon afterwards there appears on the outer side of the base of each, a small process, the rudiment of the future branchiæ. In their relative proportion, the legs increase inversely with respect to the maxillæ; the anterior being at the close of this period about four times as long as the posterior. The true tail also now becomes more clearly developed, and the rudiments of its foliaceous appendages are visible at its extremity. At the same time six transverse furrows, the indications of its future articulations, are seen on its under surface.

The authour next proceeds to trace, with great minuteness, the formation of the internal organs, regarding the lamina of the embryo from which the intestines are derived, and which lies in contact with the vitellus, as mucous membrane, while he treats the outer lamina from which the external organs take their origin, as serous membrane. First appear the

primæ viæ, commencing on the one hand with the œsophagus, which forms a union with the outer cavity of the mouth, and on the other with the intestine, connecting itself to its external opening beneath the tail. These two portions are soon after placed in continuity by the production of the stomach. After these parts the heart comes into existence, formed, as the authour believes, not from the internal layer, or mucous membrane, but from the outer or serous. It appears at first in the shape of a small compressed vesicle, seated near the junction of the anterior and posterior portions of the body. Several blood vessels are soon afterwards seen in its immediate neighbourhood, which may be regarded as prolongations of its substance; and its pulsation speedily becomes distinguishable. About the same time appear the first traces of the nervous system. An elevation extends beneath the middle line of the central piece from the œsophagus to the tail, with a slight longitudinal impression, and ten transverse superficial furrows dividing it into eleven processes, corresponding with the trophi and the legs, on either side. From these the muscles of those parts respectively take their origin. On the middle of this elevation is formed the ganglionic cord, consisting at first of eleven pairs of minute white spots; and anterior to these a short and broad process passes forwards on either side of the œsophagus. Up to this period all the parts of the embryo, with the exception of the heart, blood-vessels, and external parietes of the back, are formed of a uniform gelatinous transparent substance. The latter organs have more of a membranous consistence.

In the fifth section the authour traces the progress of the embryo in its third period of developement, the termination of which is marked by the production of the salivary glands, occupying the remaining part of May. On this, as well as on its fourth period, ending with the bursting of its envelopes and its escape from the egg, which is performed in the course of the succeeding month, he enters into equally, or perhaps, owing to the greater distinctness of the parts, even more minute details than with respect to its previous developement. But our limits warn us that in spite of all our attempts to state his leading facts in as few words as possible, we have already encroached too much; it therefore becomes necessary to treat the remainder with the utmost conciseness. It may be sufficient then to say, that the whole of the organs developed during the foregoing periods continue, in the progress of these, to approach

more nearly to the form and texture which they assume at their complete maturity, those which were before merely rudimentary now taking on their proper and distinctive character. Of the new organs that make their appearance in the third period the most important are the two livers, the brain, and the salivary glands. No new parts of any consequence are developed during the fourth period, nor is there any vestige, at its termination, of internal sexual organs.

The seventh section embraces the period between the bursting of the embryo from its shell, and the complete maturity of the animal. At the commencement of this period all its external organs are fully formed, but their outer coating is still extremely soft and flexible. It is not, however, necessary for it to proceed immediately in search of food, as it carries with it from the shell a portion of the vitellus, on which it can subsist until its coat becomes sufficiently hardened to admit of its moving from place to place with impunity. The following are the only outward changes that occur in it after quitting the shell. The legs increase in length more than in thickness; and the same is the case with the antennæ, the maxillæ, and the spurious legs beneath the tail. These last acquire only at a very late period the long bristles which in the female serve for the attachment of the eggs. The anterior extremity of the thorax acquires two lateral spines in addition to the central one, which continues to increase in length. The pedicels of the eyes become thicker. The branchiæ gradually increase in length, as do also, and with great rapidity, the little processes by means of which the animal absorbs the oxygen of the water. While the remains of the vitellus are being consumed, the body and tail gradually increase in length more than in breadth, and the latter also acquires a greater thickness. Lastly, the shell becomes firmer, and loses by slow degrees its parchment-like appearance by the addition of calcareous matter. In the mean time the number of its red points and streaks increases, and to these are added small blue spots which are most numerous on the upper surface and legs; the transparency of the outer coat for some time allowing the colours to be seen through it, presenting a beautifully variegated appearance. In the interior of the animal the changes are more important; but with the exception of the production and developement of the sexual organs, they consist, like those of the outer surface, in a gradual adaptation of parts already formed to their proper objects.

We must here interrupt our analysis for a moment to notice the obvious discrepancy between the facts detailed in the present publication, and the theory advanced by Mr. J. V. Thompson with respect to the metamorphosis of Decapod *Crustacea*, of which some account is given at p. 248 of our last volume. The observations of Dr. Rathke prove beyond all question that no such metamorphosis takes place in the young of the Crawfish, and thus confirm the doubts which we have there expressed of the universality of the fact. We cannot, however, discredit Mr. Thompson's statement that he has seen the ova of the Common Crab give birth to animals of a form very different indeed from that of their parent; we will therefore only observe in conclusion, that if there existed no optical delusion or other cause of error in the isolated observation which he has given us, the difference of organization between a Macrourous and a Brachyurous Decapod is much greater than either analogy or anatomy would have led us to suspect.

The eighth and last section of Dr. Rathke's Work contains his deductions from the previous details, both with reference to the structure of the Crawfish itself, and to its developement as compared with that of other animals. These observations are distributed under the following heads; 1, a comparison between the trophi and legs of the Crawfish: 2, a comparison between the structure and developement of the Crawfish, and that of certain nearly related animals: 3, a comparison between the progressive structure of the Crawfish, and the permanent structure of other *Crustacea*: and 4, a comparison between the structure and developement of *Vertebrata* on the one hand, and of the Crawfish on the other.

With respect to the first point he regards his observations as furnishing a striking confirmation of M. Savigny's hypothesis (now universally admitted) that the maxillæ and mandibles of *Crustacea* are analogous to the legs, or more properly that the one set of organs are merely modifications of the other. The earlier they are examined the more complete is their similarity, both in form and origin; and it is only after a certain period of their growth that this similarity is lost by the inverse developement of the parts, the basal half of the maxillæ increasing in proportion to the terminal half of the legs, and vice versâ.

Under the second head the authour compares the results of his own observations with the few similar investigations that have been attempted

by other writers, and points out the coincidences and discrepancies that occur between them. Cavolini, Jurine, Prevost and Herold are the only authours who have treated of this difficult subject; the first in a very superficial manner, in a memoir on the Generation of Fishes, &c., MM. Jurine and Prevost in several valuable papers on the structure and developement of different species of *Branchiopoda*, and M. Herold in his laborious work on Spiders. Of the primitive developement of Insects we know at present scarcely any thing. From a comparison of his results with those of M. Herold, Dr. Rathke concludes that there exists a close resemblance between the structure and developement of the Crawfish and of Spiders, and consequently a near relation between the types of their organization. The most important particular in which they agree is in the relative position of the vitellus, which lies in both at the back of the embryo, instead of being placed, as in the *Vertebrata*, in front. A remarkable difference between the two is, however, found in the developement of the abdomen, which in the Spider is applied from the very commencement to the surface of the vitellus, while in the Crawfish it makes its appearance in the shape of a perfectly free appendage. The same relative position of embryo and vitellus, and many minor points of coincidence, are met with in *Daphnia Pulex* according to Jurine, and in *Branchipus stagnalis* according to Prevost. In the latter the abdomen is highly developed, and occupies the same position with respect to the embryo as in the Spiders. The authour also derives some convincing proofs of the justice of M. Savigny's hypothesis above noticed from the developement of the trophi and legs of the *Cyclops 4-cornis* as described by Jurine.

Under his third head, the authour's first object is to prove that the Crawfish and its congeners are among the most highly organized of the long-tailed *Crustacea*, each of their external organs being as fully developed as the corresponding part in any other macrourous species, and the whole of them taken together appearing to occupy a middle station in size, as compared to each other, with reference to a similar comparison carried through the rest of the tribe. Proofs of this are adduced in the forcipated terminations of the legs, the bipartition of the posterior antennæ, the spurious legs beneath the tail, the laminated appendages of the last named organ, and the consistence and completeness of the outer covering. In the second place he combats Lamarck's opinion that the

Brachyurous *Crustacea* are more highly developed than the Macrourous, and maintains that however strongly one or two particulars in the organization of the former may argue in favour of this supposition, the weight of evidence is decidedly opposed to it. Thus, for example, the trunk of the *Brachyura* retains the same comparative breadth after its complete developement as that of the *Macroura* in the early part of its foetal state; the tail of the former is not only less developed as a whole, but also less perfect in its parts; the anterior pair of legs alone are furnished with double claws; the antennæ are shorter, smaller, and less developed; the branchiæ are less numerous and more simple; the two ventral nervous cords do not approach to a union with each other in the posterior half of the trunk, but remain at a distance, &c. &c. Lastly he points out analogical relations between the Crawfish in its various stages of developement, and the lower *Crustacea* in their permanent state. Thus at an early stage of its growth, when its articulations are indistinctly marked, it resembles the *Squilla* in this particular, as well as in its legs being apparently derived from the tail. Its maxillæ have at one period a considerable likeness to those of *Monoculus Apus*. Its legs and their branchial appendages resemble those of certain *Branchiopoda*. It wants the spurious legs, which are developed only at a late period, and thus resembles many of the lower *Crustacea*, which never possess them, &c. &c. This part of the subject, however, is treated by the authour in too superficial a manner, with reference to the importance of the questions which it involves; and is by no means so happily illustrated as might have been expected.*

* Since the above paragraph was written, MM. Audouin and Milne Edwards have published, in the *Annales des Sciences Naturelles* for June of the present year, a note on the Nervous System of the *Crustacea*, which fully justifies our last observation. Referring to Dr. Rathke's Work, and connecting his discoveries with their own previous researches into the structure of *Crustacea*, they show that the three successive stages of developement in the nervous system of the Crawfish exactly correspond with three apparently distinct types of formation observed by them in its permanent condition in other animals of the Class. Thus, the double series of ganglions, under the form of which the thoracic nerve first makes its appearance in the ovum of the Crawfish, is perfectly analogous to its permanent state in the adult *Talitrus*, which occupies a very

Von Baer's observations on the ova of *Mammalia*, Hens and Frogs, and the authour's own researches on those of *Blennius viviparus*, furnish one side of his comparative view of the structure and developement of *Vertebrata* and the Crawfish. The first remarkable difference between them consists in the diffusion of the embryo over the whole surface of the vitellus in the latter, previously to its contraction towards a determinate centre; an appearance which has never been observed in the former. The difference in the form of that body, when it first becomes visible, assuming the shape of a carina (so called) in *Vertebrata*, and that of a half ellipse in the Crawfish, appears to be of less importance. The anatomical structure of *Vertebrata* consists primarily of an external or serous membrane, an internal or mucous, and a vascular tissue interposed between them. In the Crawfish the latter appears to be wanting, and the vascular parts seem to be immediately derived from the serous membrane. Generally speaking, however, the same organs are in both cases produced by the same membrane. These observations apply equally to the ova of Spiders. On this point Dr. Rathke observes that the want of a proper vascular tissue in the embryo of *Annulosa* is in all probability the reason why these animals have no such parenchymatous intestines as the *Vertebrata*, all their secretory and excretory organs appearing only as discrete tubes without parenchymatous envelopes.

Of the two membranes, the most important in the formation of the embryo is the serous, which is developed in a very different manner in the Crawfish, and in *Vertebrata*. We cannot here follow the authour in his minute details, but must content ourselves with stating that he adopts Von Baer's type of the embryo in *Vertebrata*, as consisting of a double convolution of the embryonal sacculus proceeding upwards and downwards from a middle line; and opposes to it the type of the embryo of the Crawfish, and probably of all *Annulosa*, as formed of a simple con-

inferior station in the natural arrangement of *Crustacea*. At a more advanced period the two series of ganglions in the foetal Crawfish approach the medial line on either side, become united together, and form a single chain, which corresponds exactly with the structure of the same organ in the adult *Cymothoe*. And lastly the whole series of ganglions run together longitudinally, so as to form in the adult Crawfish a simple nervous cord, like that of the more highly developed animals of the Class. Such comparisons open an ample field of philosophical consideration.

volution of the sacculus in one direction only. The result of this distinction is, that the central parts of the nervous system are in *Vertebrata* external, and in *Annulosa* internal, to the serous membrane. The positions of the ganglionic cord corresponding with the spinal marrow, and of the intestinal nerve corresponding with the great sympathetic, are completely reversed in these two great divisions of the animal kingdom.

A similar opposition occurs in the general position and direction of all the external organs. In the *Vertebrata*, in *Batrachia* for instance, both extremities, the head and tail, as soon as they become visible, expand over the vitellus, and tend to inclose it. In the same manner, the legs and arms, and in Birds the wings, embrace the vitellus, which is placed in juxtaposition with the abdominal surface of the body; the primitive portion of the embryo remaining at the back. In the Crawfish on the contrary, the tail tends to become free, while the anterior extremity alone is applied to the vitellus, the two ends approaching each other not by surrounding the last named organ, but in the contrary direction. The limbs too, instead of embracing the vitellus, take the opposite direction and surround the outerside of the primitive portion of the embryo. Hence it follows that in the Crawfish, and the same is the case in Spiders, the inner side of the limbs corresponds with their outer side in *Vertebrata*; and that, when the Crawfish quits the egg, it turns the primitive part of its embryo towards the earth, while the *Vertebrata* turn their's in the opposite direction. What is called the abdominal surface in the former is consequently analogous to that which is termed dorsal in the latter; and *Annulosa* turn their backs, while *Vertebrata* turn their bellies, towards the surface of the earth.

Other important points of distinction are found in the structure and developement of the head and its parts, and in the disposition of the brain and nervous system in general. But we cannot afford space to enter further into these particulars. The authour concludes with some general deductions, which are, however, sufficiently obvious not to require repetition. Three plates, two of them accompanied by outlines, filled with magnified representations of the egg and its contents during the various stages of developement, and in various points of view, together with their explanation at length, complete the volume. They are executed with great care, and afford excellent illustrations of the growth of the embryo in all its stages.

*The Transactions of the Linnean Society of London. Volume XVI.
Part the Second.*

In the present part of the Transactions of the Linnean Society, the contents are partly botanical and partly zoological; the former somewhat exceeding the latter in extent. The zoological papers are from the pens of the Rev. L. Jenyns, Mr. Yarrell and Mr. Jeffreys, and these we shall proceed to notice in the order of the subjects to which they are respectively devoted.

“ Some Observations on the Common Bat of Pennant: with an attempt to prove its identity with the *Pipistrelle* of French authors: by the Rev. L. Jenyns,” first claim our attention. The Common Bat of our country, as the authour remarks, has been uniformly referred by British writers to the *Vesp. murinus* of Linnæus; but difficult as it would be to determine with any thing like certainty the precise species originally intended by this denomination, it is yet probable, from the reference made by Linnæus to Brisson, that the Bat so designated was larger than our Common English species. Such is the one known on the continent as the *Vesp. murinus*, which differs from our Common Bat not merely in absolute size, but also in colour and general appearance, in the shape of the auricle and its operculum, and in some of its relative dimensions. The difference in size is indeed most striking, the length of the body in the continental *Vesp. murinus* being three inches and a half, and the extent of wing fifteen inches; while in the Common English Bat the length is only one inch and seven lines, and the extent of wing rarely exceeds eight inches and a half.

With the continental species the name of *Vesp. murinus* may well be suffered to rest, rather than with our own Common Bat. The former has been repeatedly well described and accurately figured, but the latter, originally imperfectly described at a period when the necessity of minute investigation was less evident than at present, has since been confused and rendered almost unintelligible by the errors of copiers and compilers. But by what name should the latter be designated? Arguing from the improbability that a species so common here should be unknown on the continent, Mr. Jenyns concludes that it can scarcely have escaped the

notice of continental writers; and he finds in the description given by them of the *Vesp. Pipistrellus*, Geoff., so little variation from our Common Bat that he is induced to regard them as identical. Under that name and with the synonyms of that species in the continental authours, Mr. Jenyns accordingly describes our Bat, furnishing the requisite details of measurements, dentition, form, fur, and colour, with considerable minuteness and precision. The dimensions somewhat exceed those given by Daubenton for the *Pipistrelle*, which might probably have been obtained from young individuals; but accord generally with those furnished by Geoffroy. In Mr. Jenyns' view of the subject the *Vesp. murinus* is consequently to be excluded from the British Fauna; its place in which should be occupied by the *Vesp. Pipistrellus*, already introduced into it on the authority of a specimen procured from Scotland by Dr. Leach, which exhibits nothing like a specific distinction from the Common Bat of Pennant.

In some remarks on the habits of Bats appended to his paper, Mr. Jenyns states his belief that each species has its peculiar place of concealment. The Noctule, for instance, retreats into hollow trees; the roofs of houses are uniformly resorted to by the Long-eared Bat, *Plecotus auritus*, Geoff.; and the Common Bat is found in retirement in crevices of decayed brickwork, the cracks of old gateways and door frames, or behind gutters or pipes. In these situations the latter collect, sometimes in prodigious quantities, for concealment in the day-time, and for shelter during their winter slumbers. Complete torpidity does not take place until the temperature is very much reduced, (probably below the freezing point); but when it has supervened, a high temperature is required to awaken the animal from its sleep. In November and December this species has been seen actively flying when the thermometer has marked 38°; and has not been again met with on the wing till March, although the temperature has risen in the mean time considerably above 50°. The Noctule seeks its winter retreat at an earlier period than the Common Bat.

The leading facts embodied in the next paper which we have to mention, have been already given in the present volume of this Journal. It is "On a new species of Wild Swan taken in England, and hitherto confounded with the Hooper: by W. Yarrell, Esq." To our previous notice it is only necessary to add, that the distinctions between the

Cygnus ferus, Meyer, and *Cygnus Bewickii*, Yarrell, are clearly made out, especially as regards the structure of the *trachea* and *sternum* in the new species, which is explained in two plates, the latter of which represents these parts in three stages of their progressive developement. In the adult state of the new species, the *trachea*, of equal diameter throughout, enters the keel of the *sternum*, through which it passes to the end, where, inclining upwards and outwards, it passes into a cavity formed in the body of the bone by the separation of the bony plates, and producing a convex protuberance on the inner surface of the *sternum*. In this cavity the *trachea* assumes a horizontal direction, and makes a considerable curve reaching within half an inch of the posterior edge of the *sternum*. It then returns to the keel, along the upper part of which it passes to the exterior edge of the bone, over which it is reflected to enter the body of the bird and become attached to the lungs. In a less perfect state of developement the *trachea* occupies one side only of the cavity in the body of the *sternum*; and at a still earlier period, it is found in the keel alone, not having yet passed into the horizontal portion of the bone, in which, however, the projection indicating the cavity is already strongly marked.

In these particulars the new species differs materially from the Wild Swan, in which the *trachea* never assumes a horizontal direction, and does not even penetrate within the keel to the extent of one half of the length of the *sternum*. In the comparative length of the *bronchi*, and of the bone of divarication, in the form of the latter, in the uniform calibre of the tube of the *trachea* of the new species, and in other particulars, additional differences exist. These are clearly explained by Mr. Yarrell, who has also given comparative measurements of both species; and, in further illustration of his subject has indicated some differences in habit and in voice, the latter agreeing with the variation in the structure of the *trachea*.

To the organs of voice in Birds Mr. Yarrell has for many years been especially attentive, and the result of his enquiries respecting them forms the subject of another communication in the present part. In this truly valuable paper Mr. Yarrell describes the organ as consisting of four parts: the *glottis*, or superior *larynx*; the tube of the *trachea*; the inferior *larynx*, with its muscles; and the *bronchi*. These parts are noticed

in succession. The superior *larynx* communicates with the mouth at the root of the tongue, by a long and narrow orifice which is regulated as to its extent of opening by two pairs of muscles, one of which is adapted to close, and the other to dilate the *glottis*. By governing the size of the aperture, these constitute one of the accessory means by which the sound of the voice is regulated. The tube of the *trachea* varies in length, in diameter, and in regularity, and the voice is influenced by each of these variations; thus shrill notes are produced by short *tracheæ*, low notes by larger tubes, &c. Its substance, also has some effect on the voice; broad cartilages usually coexisting with monotonous voices, while narrow rings with enlarged membranous spaces allow freedom of motion, and consequent variety of tone.

The *glottis* and the *trachea*, however, only modify the voice, which is truly produced by the inferior *larynx*. This part varies in form, in structure, and in the number of its muscles. Its lower orifice is crossed by a bone, which forms the point of divarication whence the *bronchi* pass off to the lungs. The *bronchi* are composed of incomplete rings, the circle being completed by a delicate membrane, the *membrana tympaniformis*. On the contraction and dilatation of this, and on the power of altering the form and length of the *bronchi*, some of the varieties of intonation depend.

It is principally to the elucidation of the muscles of the inferior *larynx* that Mr. Yarrell's observations are directed. These he considers as the true muscles of voice. In some few birds, including the Condor, the King of the Vultures, and the Spoonbill, they are entirely wanting; but they exist generally throughout the class, varying in number from one pair to five pairs. A single pair is the number most usually met with, being found, with very few exceptions, in all the *Rasores*, *Grallatores*, *Natatores*, and in some of the *Insesores*, as well as in the majority of the *Raptores*. They arise from the whole outer surface of the cricoid cartilage, and descending along the *trachea*, surround it at its upper part, and afterwards divide and pass downwards in two equal portions attached to the tube, which they do not quit till they have arrived at or near the bone of divarication, when each passes off to be inserted upon the edge of the *sternum* on its own side. These sterno-tracheal muscles influence the length of the *trachea* as well as that of the *bronchi*.

Two pairs of muscles of voice exist in but few birds, and there is little uniformity of structure even in those few which possess them. In the Indian Crowned Pigeon, the second pair is formed by a slip from the first, passing downwards on each side along the *trachea*, to be inserted into the membrane between the lowest ring of the tube and the first ring of the *bronchi*; its action would be to shorten the portion of the tube, to which it is attached, and to produce tension of the *membrana tympaniformis*. In the Gannet the second pair is almost similarly inserted on a glandular substance affixed to the first bronchial ring. In the Wood Grouse the principal pair of muscles is detached from the *trachea* throughout its whole length, and is inserted into the *os furcatorium*; from these pass off, at about the commencement of their lower third, a second pair, which becomes attached to the lower portion of the *trachea*, and is afterwards inserted into the *sternum* in the same situation as the true sterno-tracheal muscles. To the other pair the name of furculo-tracheal muscles is given. In three of the species of Ducks in which there exists an enlargement of the tube of the *trachea*, there are also two pairs of muscles of voice: the first, the usual sterno-tracheal muscles; the second, a pair inserted into the *os furcatorium*, and arising, in the Velvet Duck from the bony enlargement; in the Golden-eye, partly from the enlargement and partly below it; and in the Red-breasted Merganser, about half-way between the bulb and the inferior *larynx*.

Three pairs of muscles of voice have hitherto been found only among the *Psittacidae*, throughout the whole of which they are uniform in situation and shape. The first pair, passing down the sides of the *trachea*, are inserted upon the outside of the second pair; these arise, one on each side a little above the bone of divarication, and are inserted upon the outer and central portion of the *bronchi* at the fourth cartilage. The third pair arise from the sides of the last ring of the *trachea*, and are inserted upon the whole surface of two crescent-shaped bones attached by membrane to the bottom of the tube. The action of the latter is to enlarge the aperture; the second pair have the power of contracting it; while the first influence the length of the tube.

Four pairs of muscles of voice have not yet been observed. The most complex structure, that in which five pairs exist, is found in all the Corvi, Starlings, Thrushes, Larks, Buntings, Finches, Warblers, Swal-

rows, &c. In these the pair of muscles which descend along the *trachea*, divide at a short distance above its end, and send one portion to be inserted upon the posterior end of the first bone of the *bronchi*, and another portion to be inserted in front below the extreme point of the last bone of the tube. Within the angle formed by the separation of these two muscles, a third slender muscle arises, which is inserted upon the *sternum*. The fourth arises near the middle of the bottom of the tube and is inserted, near the first, on the extremity of the first half-circular bone. The fifth, arising from the same situation as the fourth, is directed downwards and forwards, and is inserted upon the last bony ring of the tube, on the cartilaginous projection immediately below it, and on the extreme end of the first bronchial bone. The tension given by these muscles produces variation both in the diameter and the length of the bronchial tube; but its influence is inferior to that exercised by the apparently less complicated organ of the Parrots, where the lower insertion of the shortening muscle of the *bronchi*, and the power of altering the size of the aperture, more than compensate for the smaller number of muscles with which these Birds are provided.

In "A Synopsis of the Testaceous Pneumonobranchous *Mollusca* of Great Britain: by J. G. Jeffreys, Esq.," the authour has given a complete species, so far as they are yet known, of our native land and fresh-water univalve shells and their inhabitants. To the latter he has especially attended, and he has, in almost every instance, succeeded in observing and briefly describing them. On them too he has chiefly founded his larger groups; a correct principle which augurs well for his future exertions in the department of nature to which the present paper refers. There is something curious in viewing Mr. Jeffreys' Synopsis, in connexion with other papers on the same subject which have appeared from time to time in the Linnean Transactions: it shows most forcibly the advance of the principle of subdivision so universally adopted by modern zoologists. In the excellent Catalogue of British Testacea by Dr. Maton and Mr. Rackett, nearly the whole of those univalves which inhabit the land and the fresh-water were referred to the single genus *Helix*, Linn., the remaining few were placed in the genera *Turbo*, *Voluta* and *Patella*. The same plan was adopted more recently by the Rev. R. Sheppard in his list of the species found in the County of Suffolk; but in this an advance

was made towards the modern views by indicating the genera of Draparnaud and Lamarck as constituting natural sections of the Linnean genera. In Mr. Jeffreys' paper, on the contrary, the modern groups are throughout employed as substantive genera; and to these are added two other groups which the authour has deemed it right to distinguish generically, making in the whole no less than sixteen genera of land and fresh-water *Mollusca*, exclusive of the *Neritina fluviatilis*, inhabiting Great Britain. These are, among the *Helicidæ*, 1. *Succinea*, Drap., including two species; 2. *Vitrina*, Drap., four species, one of which is new, and a second now first indicated as distinct; 3. *Helix*, Auct., including, with all its dismemberments, no less than twenty-nine species, among which, however, is enumerated, as the *Helix acuta*, the *Carocolla lapicida*, Lam., the only British type of another genus; 4. *Bulimus*, Brug., three species; 5. *CIONELLA*, a new genus, which is thus characterized, "*Animal glutinosum: tentacula inferiora brevissima. Testa oblonga seu elongata; anfractu ultimo majore; apex acutiusculus: columella subinterrupta; apertura canaliculata, ad basin subeffusa, marginibus inæqualissimis: umbilicus nullus;*" in it are included three species, the *Helix lubrica*, Müll., the *Buccinum Acicula*, Müll., and the *Cion. elongata*, (*Helix octona*, $\beta.$, Gmel.); 6. *Clausilia*, Drap., seven species; 7. *Pupa*, Drap., three species; 8. *ALÆA*, "*Animal tentaculis inferioribus punctiformibus. Testa verè cylindrica: apertura intus denticulis sive lamellis incontinuis munita, marginibus subæqualibus; peristomio simplici;*" to this group are referred the *Turbo Muscorum*, Linn., the *Turbo sex-dentatus*, Mont., the *Turbo Offtonensis*, Shepp.?, and three other species; 9. *Vertigo*, Müll., including two species. Among the *Carychiadæ* are, 10. *Cyclostoma*, Drap., including two species; 11. *Carychium*, Müll., three species, one of which is the *Turbo tridens*, Mont.; 12. *Auricula*, Drap., of which four species are distinguished. The *Limnæadæ* include, 13. *Limnæus*, Drap., ten species, among which, however, is placed the *Assiminia Grayana*, Leach; 14. *Physa*, Drap., two species; 15. *Planorbis*, Müll., thirteen species; and 16. *Ancylus*, Müll., including two species.

The total number of species described by Mr. Jeffreys is ninety-five.

ART. XXXVI. *Proceedings of Learned Societies on subjects connected with Zoology.*

LINNEAN SOCIETY.

Nov. 3, 1829.—*A Description of Filaria Forficulæ*, by Mr. Benj. Maund, F.L.S., was read. Mr. Maund states that sometimes two or three of these worms, each of them measuring not less than two or three inches in length, are found in an individual Earwig, filling the whole cavity of the abdomen, and sometimes a part of the thorax also. His specimens, one of which accompanied the communication, lived two or three hours in water, after being removed from the insect, but died immediately in atmospheric air. It is unnecessary to go into any further details on this subject, the animal in question having been already well described and figured by M. Léon Dufour in the thirteenth Volume of the *Annales des Sciences Naturelles*. It is probably indicated under the same name as that employed both by M. Dufour and Mr. Maund, by Rudolphi in his work on the *Entozoa*.

Feb. 2, 1830.—A paper was read, on *The Natural History of Petrophila*, a *Lepidopterous* genus, in its larva state inhabiting rivers, and furnished with *branchiæ*, by the Rev. Lansdown Guilding, B.A., F.L.S., &c. The authour states that the very singular little moth on which he establishes his genus occurs in myriads, in its larva state, on the blocks of basaltic trap that occupy the bed of the river of St. Vincent's. Much as it differs in its habits from the majority of *Lepidoptera*, he considers one European species as coinciding with it in its economy, and referrible perhaps to the same subgenus of *Botys*; a genus which, from the variety of forms of which it is at present composed, appears to him to call for subdivision. He indicates the following as the most remarkable types occurring in his own Cabinet: 1, *CHLOEPHILA*, sp. *lineolata*, found at St. Vincent's; 2, *KAMPTOPTERA*, sp. *fuscescens*, rare in St. Vincent's; and 3, *PHAKELLURA*, sp. *hyalinata* (Fabr. Ent. Syst. ij, 2, 213?) abundant in the Antilles. The *Botys stratiotalis* (Kirby and Spence, IV, 56, 74) is the European species in which Mr. Guilding finds so

close a resemblance to his *Petrophila* in many respects, that he is persuaded of their near affinity, although there exists a trifling difference in the pupal spiracula, and in the shape of the branchiæ. The larva of the West Indian species, obtaining its food on rocks in the stream, forms silken tunnels, under which it moves in safety, without danger of being carried off by the current. When at maturity it builds a more compact habitation, which, together with the metamorphosis of the insect, is minutely described, as well as a small Trichopterous insect found in great abundance in its society, and resembling it in economy. The authour thinks it probable that many of the European *Botydæ* found in fenny places, as *Bot. lemnata*, *sambucata*, &c., approach his *Petrophila*, while those found in hedges and gardens should remain in a separate genus. His characters of *Pet. fluvialis* are as follows: *Pe. argenteo-nivea*, fuscescens adumbrata, alarum superiorum strigis apicalibus angulatis, punctulis duobus intermediis lineisque baseos tribus subcommunibus fusciscentibus: alarum inferiorum plagâ posticâ argenteo-iridescente, atro-maculatâ: abdomine fusco fasciato. Mr. Guilding's genus appears to us to be nearly, if not entirely, identical with M. Latreille's *Hydrocampe*. We may observe also that the name of *Petrophila* would be inadmissible, having been long since applied by Mr. Brown to a New Holland genus of *Proteaceæ*.

Subjoined to the paper is an *addition to the Natural History of Xylocopa Teredo*, and several other insects which had been the subjects of former communications, accompanied by additional drawings, to complete the description and figures given in Linn. Trans. vol. xv.

March 16.—A Paper was read, *On the remarkable formation of the Trachea of the Egyptian Tantalus*, by Joshua Brookes, Esq., F.R.S., and L.S. The structure in question, which is unique so far as the tracheæ of birds have yet been investigated, consists of a remarkable flattening and consequent dilatation of the lower part of the canal above the divarication of the *bronchi*. A specimen was exhibited to the meeting.

April 6.—A further description of the *Anatomy of the Mammary Organs of the Kangaroo*, by J. Morgan, Esq., F.L.S., was read. This paper is a sequel to that printed in the last part but one of the Linnean Transactions, and abstracted at p. 127 of our last volume.

After a few remarks on the domestication of this animal as the only means of making those examinations of the interior of the pouch, which

can enable us to ascertain the condition of the young when it first becomes attached to the teat, and the natural process by which it is applied to that part, the authour described the appearances which he had observed in dissecting the mammary organs of a younger animal than any of those which he had previously examined. In our notice of Mr. Morgan's former communication upon this subject, we mentioned the anatomical peculiarities which he had discovered in the immature marsupial animal, consisting in an undeveloped state of the two lower teats and in a muscular investment of the mammary glands.* From the details of the present paper it appears that in the very young animal not one of the four future teats are developed, as the two upper as well as the two lower nipples are proved to be formed by the eversion and protrusion of follicular canals.

April 20.—A Paper was read, *On Luminous Insects*, by Mr. Richard Chambers, F.L.S., maintaining, on the testimony of various authorities (some selected from books, and some collected from original sources by the authour,) that *Ignes fatui* are luminous insects. This opinion is supported by the fact often observed, that they appear to alight on various objects, and bound over others.

May 4.—Read, *An Examination of M. Virey's Observations on Aëronautic Spiders*, published in the *Bulletin des Sciences Naturelles*, by John Blackwall, Esq., F.L.S.

May 24.—This day, being the Anniversary of the Society, the following Officers and Council were elected for the ensuing year. *President*: Edward, Lord Stanley, M.P. *Vice-Presidents*: A. B. Lambert, Esq., F.R.S.; W. G. Maton, M.D., F.R.S.; E. Forster, Esq., F.R.S.; and R. Brown, Esq., F.R.S.—*Treasurer*: Edward Forster, Esq., F.R.S.—

* We are informed by Mr. Morgan, that he has found the compressing muscle of the *mamma*, described in the paper to which we allude, not only in the Kangaroo, but also in the American Opossums, and in other marsupial animals received from Australia; and that his opinion respecting the use of this muscle in compressing the *mammæ* against the marsupial bones, as a means of forcing nourishment into the mouth of the young, is strengthened by the observations he has made, that in proportion to the extent of the mammary organs, will be found the length of the marsupial bones which are placed behind them: the firm point of resistance against which the glands are pressed by the contraction of their muscular coverings being thus proportioned to the size of the *mammæ* themselves.

Secretary, J. E. Bicheno, Esq., F.R.S.—Assistant Secretary, Richard Taylor, Esq.—also to fill the five vacancies in the Council, George Bentham, Esq.; John, Earl Brownlow, F.R.S.; Rev. William Buckland, D.D., F.R.S.; Charles Stokes, Esq., F.R.S.; William Yarrell, Esq.

June 1.—The commencement of a Paper on the *Paussidæ*, a family of Coleopterous Insects, by J. O. Westwood, F.L.S., &c., was read. The insects composing this singular family, remarkable especially for the peculiar structure of their antennæ, inhabit the tropical regions of the old world, and do not exceed half an inch in length. In the year 1798, a paper by Professor Afzelius, upon the same group, was read before the Linnean Society, in which that distinguished naturalist indicated no more than five species. Since his time several important additions have been made by other entomologists; and Mr. Westwood has, in the present paper, increased the number of species to twenty-three, exclusive of those which had been incorrectly referred to the family by previous writers. In addition to the genus *Paussus*, originally established by Linnæus, he admits *Hylotorus*, Dalm., and *Cerapterus*, Swed.; and adds three new genera of his own formation. The following is his Synopsis of these subdivisions:

Elytra subquadrate, palpi labiales elongati.	Antennæ quasi 2-articulatæ.	Caput (ocellis duobus) thorace immersum	3. Hylotorus.
		Caput (ocellis nullis) collo instructum.	2. Paussus.
		Palpi labiales articulo ultimo elongato.	4. Platyrhopalus.
Antennæ quasi 10-articulatæ	5. Cerapterus.		
Antennæ quasi 6-articulatæ	1. Pentaplatarthrus.		
Elytra subovata, palpi labiales brevissimi	6. Trochoideus.		

1. *Pentaplatharthus*, Westw., is stated to be a new and very decided genus, founded on a single undescribed species, *Pent. paussoides*, Westw.

2. *Paussus*, Linn., of which twelve species are described, four of them new. 3. *Hylotorus*, Dalm., consists but of a single species, *Hyl. Bucephalus*, Dalm. 4. *Platyrrhopalus*, Westw., has for its type the *Paussus denticornis*, Don. It contains four species, two of which are new. 5. *Cerapterus*, Swed., is composed of three species, one of which is supposed to be new. 6. *Trochoideus*, Westw., is founded on a single species, *Paussus cruciatus*, Dalm., discovered by that authour in a package of Copal Gum. Mr. Westwood also mentions the *Hispa bihamata*, Linn., as supposed to belong to this family; and gives the characters of a new genus, which he names *Megadeuterus*, related to the *Telephoridae*, and containing two species, the type being *Paussus flavicornis*, Fabr. The drawings in illustration of this paper comprise fifty-five figures of species and their anatomical details, and include representations of all the genera, and of the new species described by the authour.

A paper by John Morgan, Esq., F.L.S., describing some *Anatomical peculiarities in the Organs of Deglutition in several animals of the Order of Rodentia*, was also read. In the *Capybara*, (*Hydrochærus Capybara*), and in some other animals of the Rodent order, the authour has observed a singular developement of the *velum pendulum palati*, to which he has assigned functions of a different description from those which are attributed to the same organ in any other tribe of animals. After noticing the great extent of the grinding surfaces of the molar teeth of the *Capybara*, and the necessity for such an arrangement in the masticating organs of an animal living occasionally upon hard vegetable substances, and possessing a single stomach, he proceeds to show that the complete mastication of the food is not only provided for by the form and extent of the teeth, but that it is rendered absolutely indispensable to the passage of nutriment from the mouth to the stomach. This necessity arises from the peculiar formation of the *velum*, which occupying the whole area of the passage through the fauces, would form a complete *septum* between the mouth and *pharynx*, but for the existence of a small circular aperture in its centre through which the food is allowed to pass. The *velum palati* thus enlarged assumes, during the act of swallowing, from the pressure of the food against its anterior surface, the shape of a cone or funnel; and the smaller end or apex of this funnel, which is terminated by the central aperture, is thrust backwards into

the cavity of the *pharynx*, beyond and above the opening of the *glottis*, to which it thus affords additional protection. A sort of membranous strainer is thus produced, through the small aperture of which the grosser particles of unmasticated food are prevented from passing. The muscles attached to these parts were shewn to consist in a sphincter of the funnel shaped membrane, connected with and supported by an anterior and posterior muscular column on each side. The two anterior columns arising from the fore part of the *Os Hyoides*, and ascending behind and partly through the muscular fibres of the root of the tongue, are continued upwards one on each side of the funnel, and are inserted into the posterior part of the palatine membrane; the posterior columns are attached above to the palate and descend on either side of the funnel to be inserted into the lateral parts of the *pharynx*. These four muscular supports of the membranous strainer or funnel shaped *velum palati*, are considered by the authour as analogous to the muscles forming the pillars of the *fauces* in other animals.

A paper was also read, entitled, "*An attempt to introduce a more precise distribution of the genus Papilio*, by George Milne, Esq., F.L.S. The authour proposes a recurrence to the Linnean genus *Papilio*, and its subdivision into eight phalanges; and concludes his paper with some remarks upon the innovations made on the Linnean system, chiefly as regards Lepidopterous insects.

ART. XXXVII. *Scientific Notices.*

Note on the British Species of Caryophyllia. Stokes.

In a "Note" appended to some very interesting "*Notes on the habits of a Caryophyllia from Tor Bay, Devon., by H. T. De la Beche, Esq., F.R.S., &c.*" inserted in the Zoological Journal, (Vol. III., page 481), the Coral referred to by the authour was described by Mr. Broderip as a new species, under the name of *Caryophyllia Smithii*. Dr. Fleming has recently, in the Edinburgh New Philosophical Journal,

characterized as a "mistake" the statement made by Mr. Broderip, that "the hard parts of this indigenous species do not appear to have been any where described;" remarking that he (Dr. Fleming) had himself "published (in the second volume of the Wernerian Society's Memoirs,) a description of the same species, fourteen years previous to 1828" the date of Mr. Broderip's Note. To this observation Mr. Broderip has replied, in the periodical in which it was made by Dr. Fleming, and has exonerated himself from the charge by referring to the memoirs of the Wernerian Society, where he finds the *Caryophyllia* observed by Dr. Fleming described as the *Car. Cyathus*, Lam.; under which name, with some variation in the orthography, it is again given in Dr. Fleming's "British Animals."

The *Car. Smithii* having been shewn by Mr. Broderip, in his original note on the subject, to be specifically different from the *Car. Cyathus*, Lam., (*Madrepora Cyathus*, Ellis and Sol.) it follows that a "mistake" rests with Dr. Fleming, who, if he has (as he states) described "the same "species" with Mr. Broderip, has committed an error by referring it to a species from which it is essentially distinct; and, if he has really described the *Mad. Cyathus* (as he twice affirms that he has,) has not at any time "published a description of the same species" as that characterized by Mr. Broderip.

With Dr. Fleming it remains to explain which of these mistakes has been committed by him: if the *Car. Smithii* has been described by him under the name of *Car. Cyathus*, we yet know of but one indigenous species of the genus; if, on the contrary, he is right in regarding his discovery as the *Car. Cyathus*, there are then two species, instead of one, to be included in the British Fauna.

*Notice on the Rev. L. GUILDING's description of Ancyclus. By the
Rev. M. G. BERKELEY.*

At page 535 of the third Volume of the Zoological Journal, is a description of the animals of two new species of *Ancyclus* from St. Vincent's. Mr. Guilding remarks in a note: "Genus *Patelladis* analogum, at fortè "*Lymnæadis* affine." The true *Ancyclus* is undoubtedly one of the *Lymnæadæ* and nearly allied to *Physa*; but there are some points in the descrip-

tion of Mr. Guilding's *Ancylus*, which make it doubtful whether his shells really belong to that family. In the description of the animal he writes "Animal unisexuale? Penis? exsertus ad radices tentaculi sinistri. "Branchiarum ramus parvulus prope anum et foramen laterale." In all which points it differs from that of the *Ancylus* (*fluviatilis* and *lacustris* e. g.) The species which I have had the best opportunity of examining is the first of these.* The animal is hermaphrodite. It has a retractile (not exserted) penis, at the base of the left tentaculum. The pulmonary cavity, like that of *Physa*, is on the left side, with a valvular margin, in one corner of which is situated the rectum: between this and the foot is the orifice of the matrix: the animal breathes air, and is able to swim by means of its broad foot. It agrees with *Physa* more particularly in being a sinistrorsal shell; in the pulmonary cavity being on the left side, as also the penis, orifice of matrix, and anus; and in having an auricle or pouch at the under side of the base of the tentacula, whereas in *Lymnæa* and *Aplexa* this does not exist; though in *Planorbis* (*corneus*,) which again is a sinistrorsal shell, the auricle is strongly marked.

Now if what is figured at Tab. Supp. 26. fig 5. b. be really pectinated branchiæ, capable of separating air from water, the animal clearly does not belong to the family *Lymnæadæ*, which consists of animals coming to the surface to breathe air. Indeed, were it not that Mr. Guilding's *Ancylus* has an exserted penis (if I rightly understand him to mean one which is not retractile, as for instance in *Lymnæa*,) I should (with all due deference and respect to his accuracy) be tempted to conceive it possible, that, in so small a subject, and under peculiar circumstances of light, he may have been deceived, and have taken for a plumè of branchiæ the matrix distended with eggs. Fig 5. a. has quite this appearance: and in fact Mr. Guilding's own description favors this view; for his expression is "Branchiarum ramus parvulus prope anum et foramen laterale." For as he does not seem to have observed the orifice of the matrix, the "foramen laterale" must of course mean the pulmonary cavity. Besides, I would observe that in *Ancylus fluviatilis*, the orifice of the matrix is

* I had an opportunity of ascertaining beyond all doubt that the animal is hermaphrodite, in September, 1829, at Cheddar in Somersetshire. Mr. Lowe has also had the same good fortune in Madeira.

situated at the apex of a small conical projection. Mr. Guilding's description of the eggs agrees almost exactly with Pfeiffer's.

Should future observations confirm those which Mr. Guilding has already recorded, his shells will surely constitute a new genus, singular, amongst the fresh-water *Pectinibranchia*, for the patelliform shells analogous to *Calyptræa* and *Pileopsis* amongst the salt-water *Pectinibranchia*. In such case also, there would be a singular deviation from the usual structure in that order, as the cavity of the branchiæ will be not immediately behind the neck, but lateral. If so, here again will be a remarkable analogy of deviation from the usual form in the order *Pectinibranchia*, with *Cyclostoma*, *Helicina*, &c., singular amongst the *Pulmonifera* for having the frontal margin of the mantle disunited from the neck, and therefore exposing the pulmonary vault.

Notice relating to Mustela flavigula, Bodd. By the Hon. CAPT. SHORE.

THE animal is found to my knowledge throughout Kumoun, Gurhwall, and part of Sirmoor, provinces in the hills bordering on the Himaleh, extending from the river Kalee to beyond the Jumna, a piece of country about three hundred miles long by sixty broad. As it is met with in Nepāl, which is some hundred miles to the south east of the above provinces, it would probably be found in all the hill country which lies between them, as it is much the same in surface, climate, and productions, both animal and vegetable. It chiefly frequents the warm vallies, but it is also found on the higher ridges where the climate is perhaps as warm as the middle of France. It is as common as, or perhaps rather more so than, the Polecat in England. I never heard of its being seen in the plains of India. It lives in holes in rocks, or in trees, in climbing which it is excessively active. Its food is chiefly birds, rats, mice, hares, and even young fawns of the Kakur, (a species of Deer about 18 or 20 inches high with eye-teeth like a dog, and whose cry is like the bark of a small dog.)

During my residence in the hill provinces above mentioned, I have at different times shot four of them, and have had two alive, and the bodies and skins of perhaps a dozen, brought to me by peasants, (some males, some females,) besides seeing several others killed. The animal varies very much in colour. In all the upper half of the head, legs, rump, and tail, are very dark blackish brown, in some black. The chin and lower jaw are pure white: but the throat is in some, bright yellow; in others, of an orange tinge; in others again light tawny. The rest of the body is tawny with the tips of the hairs black; but in some the tawny darkens into brown, and even dark brown, while more of the ends than the very tips of the hairs are black, so as to make the animal appear almost all black. It would not seem to change with the season, for at the same time I have seen different specimens fully grown with the colours differing as above mentioned. The enclosed sketch is copied from one made by myself in June, 1827, from a specimen which I shot on that day. I have seldom, if ever, seen one with less black about it, but I have seen them of every shade between this and the one sent to the Zoological Society, which is now much darker than when first brought to me in September, 1828, when it was about four months old. It had been caught when not many days old, and was so tame, that it was always kept loose about a well, sporting about the windlasses, posts, &c., and playing tricks with the people who came to draw water.

The length of the one from which the sketch is taken, from the tip of the nose to the setting on of the tail, was $20\frac{3}{4}$ inches. Length of tail $19\frac{1}{2}$ inches.

The native name of the animal in Gurhwall and Kumoun, is Toötu-rälæ; in Sirmoor, Koseah or Koosiar.

[The sketch inclosed by Capt. Shore to Mr. Vigors resembles very nearly the figure given in the Zoological Journal, Vol. iv. pl. viii, as the *Mustela Hardwickii*, which is synonymous with *Must. flavigula*, Bodd. The living specimen in the collection of the Zoological Society is so much darker, as to induce us to give a second representation of it in a Supplementary Plate, for the purpose of exhibiting the extremes of colour of a very rare and interesting animal.—Ed.]

Notice on some new species of Birds. By N. A. VIGORS, Esq.

I beg to insert the following brief characters of some interesting species of birds lately come to my knowledge. I hope to give a more detailed description of them, accompanied by figures of the more important species, in the next number of this Journal, together with the characters of some other species lately added to the collection of the Zoological Society, which I have not as yet had leisure to examine with accuracy. The accession to our list of the *Psittacidæ* is of much value.

EURYSTOMUS COLLARIS. *Rubro-brunneus; genis, corporeque subtus purpurascens; gula, rectricibusque lateralibus cæruleis; remigibus, rectricibusque mediis nigris; his versus apicem, illarumque pogoniis externis azureis; rostro flavo.*

Magnitudo *Eurystomi Orientalis*.

Hab. in Africâ. In Mus. Soc. Zool.

TYRANNULUS ALBO-CRISTATUS. *Supra plumbeo-griseus; subtus flavescens; gula, fasciis duabus alarum, plumisque verticis in medio albis.*

Magnitudo *Sylvia reguli*, Lath.

Hab. in Brasiliâ. In Mus. Soc. Zool.

PYRRHULA CAPISTRATA. *Corpore isabellino; capite supra, caudâ, alisque nigris; his speculis duabus albis.*

Longitudo corporis, $3\frac{3}{4}$ unc.

Hab. in Brasiliâ. In Mus. Soc. Zool.

PSITTACARA NANA. *Viridis; fronte, collo anteriore, pectoreque grisescentibus.*

Longitudo $8\frac{1}{2}$ unc.

Hab. in Insulâ Jamaicâ. In Vivario Soc. Zool.

PLATYCERCUS STANLEYII. *Supra viridis; capite supra, corporeque inferiore coccineis; genis sulphureis; remigibus, rectricibusque mediis*

fuscis; humeris, rectricibusque lateralibus azureis.

Magnitudo *Platycerci eximii*.

Hab. in Australiâ.

PLATYCERCUS PILEATUS. *Viridis; corpore subtus, tectricibus alarum inferioribus, remigibus, rectricumque pogoniis externis azureis; capite supra dilutè castaneo-rubro; gulâ, genis, collo infra, dorsoque imo viridi-flavis; femorum tectricibus crissoque coccineis.*

Magnitudo *Platycerci Pennantii*.

Habitat in Australiâ.

PALÆORNIS COLUMBOIDES. *Bitorquatus Dorso; abdomineque imis, alis, caudâque supra viridibus; capite, pectore, dorso abdomineque summis plumbescenti-canis; torque collari superiore gracili, gulâque nigris: torque inferiore latâ, fronte, regioneque circumoculari cærulescenti viridibus.*

Magnitudo *Palæornis Alexandri*.

PALÆORNIS INORNATUS. *Viridis, subtus pallidior; rostro nigriscenti; collo sine torque.*

Magnitudo paullo minor quam *Palæornis torquati*

This bird has lived three years in the Menagerie of the Zoological Society, during which time it has retained the above characters without change.

I have seen many living specimens agreeing with the above characters which are said to have come from Africa. They have hitherto been supposed to be the young of *Pal. torquatus*, but from the length of period, during which the individual here described has remained without change, I can not but consider the species to be distinct.

PALÆORNIS? ROSACEUS. *Viridis, supra dilutior; pectore medio, femorum tectricibus rectricibusque infra rosaceis.*

Magnitudo *Pal. Alexandri*.

In Vivario Soc. Zool.

The above bird is at present in the act of moulting, and its wings and

tail are so imperfect as to prevent me from deciding with certainty the group to which it belongs. Its bill is more that of the genus *Platycercus* than *Palæornis*; but a drawing now in my possession, which was said to have been taken from the bird when in a perfect state of plumage, gives it the tail of *Palæornis*. On this authority I provisionally place it in that group. I have seen a second specimen agreeing with the individual described; but I have not been able to ascertain the locality of either. I should not be surprized if they should be found eventually to be females of some described species; their plumage being of that indistinct character which marks the females of some of the species of the two allied groups above mentioned.

COLUMBA SPILOPTERA. *Capite posteriori, dorso, alarumque tectricibus pallidè brunnescenti-rubris, his guttis albis gracilibus notatis; fronte, corporeque subtus plumbescenti-canis; gulâ, crissoque albis; remigum pogoniis internis basi rufis; pedibus flavis.*

Longitudo corporis $5\frac{1}{4}$ unc.

Habitat in Australiâ.

ORTYX MONTEZUMÆ. *Capite posteriore, dorso, alisque brunneis, plumis in medio striis rufis ad latera fasciis nigris notatis; fronte, gulâ, crisso, corporisque lateribus nigris, his albo-guttatis; regione circumoculari, striâ utrinque sub rictu, alterâ utrinque ad frontem circuloque a supercilio ad pectus descendente, albis; abdomine medio castaneo.*

Magnitudo *Ortygis Californiani*.

Habitat in Mexico. In Musæo Soc. Zool.

ORTYX SQUAMATUS. *Corpore plumbescenti-cano, interscapulio pectoreque dilutioribus, horum plumis circulo gracili brunneo ad apicem cinctis; cristæ occipitalis apice, gulâ, abdomine medio, crisso, striisque abdominis laterum rufescenti-albis.*

Magnitudo *Ortygis Californiani*.

Habitat in Mexico. In Musæo Soc. Zool.

Note on Cæstrus, by W. S. MacLeay, Esq.

Having just seen my paper in the Zoological Journal on the Cæstrus of Mr. B. Clark, it has struck me that when this gentleman says, that "the *Cæstrus bovis* has no aculeus or weapon of infliction in the abdomen," he could only have stated so obvious and well known a fact upon a misunderstanding of the following words in the note p. 358 of my paper in the Linnean Transactions. "Aristotle could never have seen a female of the modern Cæstrus, as appears from his stating that no Dipterous insect has its sting placed behind." The veriest Tyro in Entomology must know that what is meant here, is not that Cæstrus has a real sting like the females of Hymenoptera; but merely that if Aristotle had seen the exerted ovipositor of an Cæstrus, he like Mouffet must from the state of his entomological knowledge have taken it for a sting.

In awarding the accurate meed of praise to Fischer's publication on Cæstrus, I ought to have stated that he like Mr. Clark describes the Pupa of Cæstrus bovis for the larva. What is supposed to be the full grown larva of this insect is often the Pupa. To understand the real form of the larvæ, the young tumours of the hide ought to be examined, and not those full grown ones from which the insect is on the point of emerging to undergo the remainder of its pupa state on the ground.

Havana,

April 7th, 1830.

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ART. XXXVIII. *Notice of a new Species of Herring.* By
WILLIAM YARRELL, Esq., F.L. and Z.S.

EXAMINATION of considerable quantities of the various sorts of fish caught at the mouth of the Thames and Medway, at this season of the year, by fishermen engaged in taking sprats, has enabled me to select what I believe to be a second and undescribed species of Herring.

The common Herring, when it visits our coast in summer, is taken heavy with roe, which it deposits towards the end of October. It is certain that the fishing for them is abandoned about that time, as no purchasers could be found for the "shotten Herring," and it is also well known that the Herrings having cast their roe retire from the shore to deep water. In the last week of February, 1828, I obtained at Brighton a few of the young of our common Herring, then from four to five inches long. These were caught by fishermen who worked nets with small meshes for Atherines. Great numbers of the young of the common Herring are taken with the sprats; they are called yawlings by many fishermen, a term probably derived from yearling, but these young Herrings differ materially from the Herring which I believe to be new. The yearling fish have the elongated form of the adult common Herring. If 7 inches long, which is about their average length, they are only 1 inch and $\frac{3}{8}$ deep, and are without roe. Having examined them repeatedly during the winter months, I am induced to believe they do not mature any roe during their first year; and the fact of their remaining in large

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shoals at the mouth of the Thames, may be taken in corroboration, for had they matured and deposited any roe, they would, like the adult of their own species, have experienced the same necessity for retiring to deep water.

The Herring, however, which it is now my object to particularise, is at this time, January 31st, heavy with roe, which, from the appearance of the fish, will not be deposited till the middle of February. I have been told that Dr. Leach has often stated that our coast produced a second species of Herring, but I am not aware that any notice of it has ever appeared. In order, however, to identify the name of so distinguished a naturalist with a fish of which perhaps he was the first observer, I propose the name of *Clupea Leachii* for this species, and describe it as follows. Much deeper in proportion to its length than our common Herring: the adult fish measuring but 8 inches long, is 1 inch $\frac{7}{8}$ deep, and has both dorsal and abdominal line much more convex; a common Herring of 1 inch $\frac{7}{8}$ deep would measure $10\frac{1}{2}$ inches in length. The under jaw in the new species is provided with three or four prominent teeth placed just within the angle formed by the symphysis. The superior maxillæ have their edges slightly crenated; the eye is large, and the fish, after it has been dead two or three days, exhibits the red appearance about the orbits and opercula, so well known to occur both in the common Herring and Sprat; the dorsal fin is placed behind the centre of gravity, but not so much so as in the common Herring; the scales are smaller without any distinct lateral line; the back and sides are deep blue, with green reflections, passing into silvery white beneath; and the edge of the belly is carinated, but without serration. Besides some slight but constant differences in the relative number of the fin rays, there is also a difference in the number of the vertebræ,—thus

	D.	P.	V.	A.	C.	Vertebræ.
Common Herring	17	14	9	14	20	56
Leach's Herring	18	17	9	16	20	54

The flesh of the new species also differs from that of the common Herring in flavour, and is much more mild.

Of the viscera in this species, the liver is small; the stomach narrow and elongated, with its inferior extremity attached to the membrane investing

the swim-bladder; the pyloric appendages 20 in number, from the base of which the intestine passes in a straight line to the vent.

It is even probable that our shores produce a third species of Herring much larger than either of the two now named. In Pennant's British Zoology, it is stated under the article Herring, on the authority of an experienced fisher, that there is sometimes taken near Yarmouth a Herring distinguished by a black spot above the nose; and that he once saw one that was 21 inches and a half long. He insisted that it was a different species, and varied as much from the common Herring, as that does from the Pilchard. A notice, it may be added, appeared in a Glasgow Newspaper of the last week in May, 1831, that "a Herring had been caught in the Tay, which weighed four pounds and one quarter:" and Anderson the historian of Greenland and Iceland, mentions Herrings of two feet in length.

The Herring of the American coast is distinct from either of those which visit our shores; it is less in size and very inferior in quality. A small quantity are occasionally imported here in a dried state, and from examination of these it appears that their average length is about 7 inches; the dorsal fin contains 16 rays, the pectoral 19, ventral 10, anal 16, caudal 18, and the vertebræ are 58. The Herring of the Mediterranean appears, by the description of M. Risso, to be also distinct from either of the species here enumerated: its branchiostegous rays are said to be six in number, its dorsal fin contains 17 rays, pectoral 17, ventral 8, anal 18, caudal 18, and it deposits its spawn in summer.

While on the subject of the species of the genus *Clupea* I may mention that I obtained last summer two species of Shads from the Thames, the *Clup. Alosa* of Linnæus, and the *Clup. fallax* of La Cépède, the one with teeth, the other without, but externally very similar. Baron Cuvier, in the second edition of his Règne Animal, Vol. II., p. 319, has advanced the Shads to the rank of a genus, separating them from the Herrings, on account of the difference in the form of their intermaxillary bones.

The *Allis* of Pennant's Zoology in the *Clup. Alosa* of M. Cuvier.

The *Clupea Leachii* is figured on Plate XII.

ART. XXXIX. *On the Genera Melampus, Pedipes and Truncatella: with Experiments tending to demonstrate the real nature of the Respiratory Organs in these Mollusca. By the Rev. R. T. LOWE, B.A.*

Class. GASTEROPODA.

Order. PECTINIBRANCHIA.

Fam. PLICACEÆ. (Les Plicacées, Lam., excl. Tornatella.)

Gen. MELAMPUS, Montf.; Les Melampes, Cuv.; Conovulus, Lam.; Auriculæ pars, Ejusd., Syst., et Féruss.; Volutæ species, Linn., Montag., Donovan., Turt.

Tentacula (2 contractilia) annulata, subcylindrica, obtusa, basi distincta; oculis sessilibus, paulló supra basis angulum internum positis. Caput infra tentacula porrectum, sc. ante eorum basin deorsum spectans; buccis labialibus utrinque magnis, dilatatis, anticè coalitis, depressis, horizontalibus, discum latum, bilobum, quasi pedis partem anticam, formantibus. Os subtus ad emarginationem in medio disci hujusce labialis; simplex (ut in *Helice*,) sc. maxillâ corneâ, lunatâ, superiore; inferiore nullâ. Pes simplex brevis ovalis anticè obtusissimus, vix truncatus; posticè subattenuatus, obtusus. Pallium collare (*le Collier*, Féruss.) tumidum, siphone nullo; orificio respirationis vel ani postico ad dextrum corporis, ut in *Helice*. Operculum nullum.

Testa solida, subconiformis, lævigata, plerumque non sculpta, unicolor, vel spiraliter obscurè subfasciata. Spira breviuscula. Columella plicata. Labrum simplex, supernè integrum, in collumellam desinens, posticè vel infernè subsinuatum.*

Epidermis nulla.

Animal littorale, amphibium, sed revera marinum, et *branchiis* spirans.

The genus *Melampus* was formed by Denys de Montfort for the reception of the *Bulimus coniformis* of Bruguière. Lamarck had also once

* This slight notch corresponds to the situation of the respiratory or anal orifice in the mantle.

distinguished the same shell, along with several others generically related to it, by the name of *Conovulus*; but he afterwards re-united this genus to his *Auriculæ*, placing it amongst the air-breathing *Gasteropoda*: an association in which he has been followed, though not without some appearance of hesitation, by the Baron de Férussac in his valuable and masterly *Tableau Systématique*. Cuvier, however, had long before in his *Règne Animal*, first edition, adopted both De Montfort's genus and name; though he considered the shells included in it* as fluviatile, and placed the genus between his *Auricules* and *Actéons* (*Tornatellæ*), all three being arranged along with *Pyramidella* at the end of his "Pulmonés aquatiques." Sowerby has also not failed to perceive both the characters of the present group, and its true affinities.†

It is not necessary to enter into the question of priority respecting the names *Melampus* and *Conovulus*; for the last, being composed of the names of two established genera, is totally inadmissible by the common rules of nomenclature. But it will be necessary to enter a little at large into the reasons which have caused me to dissent in more important particulars from the united authorities of a Cuvier, a Lamarck, and a Férussac as to the affinities of the present genus, and the nature of the respiratory organs.

The foregoing generic description is drawn up from two species, both apparently new, which I have had abundant opportunities of studying. They both occur on the North Coast of Madeira, between high and low water mark on the beach, lurking beneath the lowest stratum of large rounded stones of which it is composed, at the depth of two or three feet below the surface. The singularity of this habitat led me at once to suspect the true nature of the animal: and since all efforts at dissection, to ascertain the nature of the branchial system, were baffled by the small size of the species, I had recourse to a series of experiments, of which the following are abstracts as they stand in my notes.

Experiment 1.

A number of the animals of *Melampus æqualis* with others of *Pedipes*

* Viz. *Voluta minuta*, Gmel. (*Bulimus coniformis*, Brug.) *Bulimus monilis*, Brug., and *Bul. ovulus*, Brug.

† See *Pyramidella*, Sowerb. Gen. I cannot, however, agree with my friend Mr. Sowerby in adopting Lamarck's name, *Conovulus*.

afra were kept for some months in a glass of *sea-water*. They constantly affixed themselves to the side of the glass *above* the water; at first indeed to the cover; but as the weather grew hotter, they descended lower, fixing themselves in a group to the side, a little above the surface. If any fell into the water, they speedily made their way out of it. When immersed, a bubble of air was always seen between the edge of the mantle and the body of the animal on the right side. No particular attention was paid to them, and the water often was not changed for a fortnight or more. They all remained quite healthy, though altogether inactive. Yet if the cover was left off accidentally at night, most of them were found in the morning to have crawled out of the glass to some distance on the table. No food was given to them the whole time.

Experiment 2.

A repetition of the preceding, for some months, with a fresh set. Habits precisely the same.

Experiment 3.

Two specimens of *Melampus aequalis* were placed in *fresh-water*: the animals immediately shrunk within the shell, and never came out again while they remained in the water. One of them having been immersed in it an hour or two, recovered on being again placed in *sea-water*. The other which was left in the *fresh-water* never crawled again, and was dead the next day.

Experiment 4.

Numerous specimens of *Melampus aequalis*, which have lain neglected in a tin box among wet sponges since February 6th, I took out to-day, (March 10th) alive, and they crawled actively about. All the specimens mixed with them of *Pedipes afra*, (which were also numerous,) and of *Melampus exiguus* are quite dead: but others of *Littorina vulgaris*, (*Turbo littoreus*, Linn.,) are quite lively.

Experiment 5.

Melampus exiguus placed in a glass of *sea-water* remains generally at the bottom: and though sometimes crawling up the sides, never remains above the surface. Nor when below, has it ever the air-bubble on the right side, as in *Melampus aequalis*.

Experiment 6.

Another set of *Melampus exiguus*. They are often seen with an air-

bubble below the surface, like *Mel. æqualis*; but they never come above the surface; and though occasionally remaining for some time at the edge of the water, they generally keep quite immersed or towards the bottom.

Experiment 7.

I have this moment before my eye, a specimen of *Melampus exiguus*, fixed at the edge of the water, opening and closing a notch or kind of orifice between two slight lobes of the mantle (on the right side, between the body and outer lip of the shell, near the lower corner of the aperture,) and letting occasionally a bubble of air escape. It is in fact exactly similar to the respiratory orifice which opens occasionally in a *Limnæa* or *Helix*. The hole is so distinct now, there can be no mistake. There is a slight indentation or sinus in the outer lip of the shell corresponding to its place in the mantle. It is necessary to observe, that the opening and closing of this orifice takes place above the surface of the water; the animal having so placed itself along the edge, that the outer lip of the shell, together with the edge of the mantle are just out of the water: and that the appearance of the whole process (which I have observed for a quarter of an hour, the animal in that time frequently opening and closing the orifice) is that of its being done to admit or exclude air.

Experiment 8.

Two specimens of *Melampus æqualis* were inclosed in separate bags of fine net, and immersed in the same glass of sea-water. They had each on the right side, a considerable way behind the tentacula, (in fact between the outer lip of the shells and the body, in the mantle) a large air-bubble, apparently standing at the mouth of an orifice;* which as the animal crawled about beneath the water, dilated and contracted occasionally, but not at regular intervals: sometimes the air-bubble was quite drawn in; at others protruded. On touching the animals, and forcing them to retreat within the shell, not only this air-bubble, but three or four times as much more, issued forth from this orifice, as well as from

* Adanson, in speaking of *Pedipes*, says, "Le manteau, &c. laisse à droit " un petit trou rond auquel répond l'anus." Hist. du Seneg.; Coquill., p. 14. I have frequently observed this orifice also in *Pedipes afra*, when taken out of the water, and forced to retreat within its shell; occupying the whole space between the great tooth or fold, and the lower angle of the aperture.

the other side of the body; indeed all round the aperture of the shell. After this, there was no longer any appearance of an air-bubble, as the animal crawled about.

In considering the foregoing experiments, it is observable, that the argument which might be drawn in support of the union of *Melampus* with the *Pulmonea*, from the habits, &c. recorded in Nos. 1 and 2, is neutralized altogether by No. 5. No. 3 is a strong proof on the other side: for there is no reason why a truly pulmoniferous animal should be sooner drowned in fresh than in sea-water: the fact is, indeed, not so. But it is well known that a marine *Pectinibranchia* does not long survive a sudden transition into fresh-water; and that the manner of its death is precisely similar to what is related in Experiment 3. In regard to No. 4, the supposition that all the species in the box belonged truly to the *Pectinibranchia*, seems to be the one involving fewest difficulties or contradictions; indeed none perhaps but what admit of explanation. In fact, two of the species, *Littorina vulgaris* and *Pedipes afra*, undoubtedly belonging to the *Pectinibranchia*, the survival of one only of two species of *Melampus* is no more strange, on the supposition of their being also *Pectinibranchia*, than is the survival of one only of the two former. And at least, the survival of *Littorina vulgaris* in the same box, and consequently under precisely similar circumstances, does away with the singularity of *Melampus æqualis* surviving, when deprived of its native element, on the supposition of its belonging also to the same order.

No. 8 affords an explanation of the remarkable appearance described in No. 7: an appearance which was at first, it must be confessed, rather puzzling. This appearance, however, it seems is only caused by the attempt to exclude the air, which the animal has accidentally taken into the cavity of the shell, as well as amongst the branchiæ, after having been some time out of the water; as was in fact particularly the case with those of No. 8. It is very possible indeed, that the animal, as long as its branchiæ are moist, can breath atmospheric air, and support life; as do certain *Crustacea*, Carp, Eels, &c. but the above appearance proves no more. It does not prove that the animal has not pectinated branchiæ: while the following experiments go very far to prove that it has.

Experiment 9.

- June 1. Two specimens of *Melampus æqualis*, from the same place, were inclosed in separate bags, and immersed in the same glass of sea-water.
- 12. Both were dead ; the water never having been changed since June the 4th, when they were certainly alive. They were also alive on either the 6th or 7th, but I cannot speak quite positively.

Experiment 10.

- June 22. Two specimens of the same inclosed and immersed as above.
- 26. Both dead. The water has not been changed.

Experiment 11.

- June 26. Two specimens of the same inclosed and immersed as before.
- 29. One dead ; the other sickly. The water was changed.*
- 30. The survivor alive.
- July 1. Dead.

Experiment 12.

- July 19. Two specimens of the same inclosed in bags, and immersed in separate glasses of sea-water.
- 20. Twenty-four hours after both are alive and healthy ; thirty hours after, one is sickly and retracted ; the other quite healthy.
- 21. The last is quite healthy ; the other quite retracted, and, I think, dead. Water changed for both.
- 22. Both quite dead.

Experiment 13.

- Aug. 10. Two specimens of the same inclosed in separate bags, were immersed in the same glass of sea-water.

N. B. These are the two specimens mentioned in Experiment 8. After the air had been expelled in the manner there described, they were left covered by the water ; no more air-bubbles appeared.

* The water was changed in this, and in all the experiments, by pouring in gently the fresh, and suffering the contents of the glass to run over its sides till the water was completely renewed. Thus, no part of the bags was ever for an instant exposed to the air. Care must be taken to pour in the water gently lest bubbles of air should be driven into the bags ; which should also be well soaked previously to the experiment, to expel every particle of the same.

- Aug. 11. Both alive and well. Water changed.
 — 12. Ditto. Ditto.
 — 13. Ditto. Ditto.
 — 14. Both dead.
-

The foregoing experiments are set down in the order in which they were made ; and it is possible that the former of them may at first lead others, as they did myself, to different conclusions from those I am now convinced are the true ones. At least, they might have been so arranged, as to establish, in the first place, the fact attempted to be proved in the mind of the reader, and to enlist first impressions on my side, were victory, not truth, the object. Yet, antecedent to all experiment, the following are strong arguments that *Melampus æqualis* and *exiguus* belong to the *Pectinibranchia*. For,

1. They are found on the sea-beach, between high and low water-mark.

2. In a state of nature they have the habits, and are found in the company, of other undoubted marine *Pectinibranchia*, viz. *Pedipes afra*, and *Truncatella truncatula*.

The positive arguments on the same side, to be deduced from the foregoing experiments are,

1. In confinement, one of the species remains voluntarily beneath the surface ; the other has the habits of other littoral species, decided *Pectinibranchin*, viz. *Littorina vulgaris*, *Pedipes afra*, &c.

2. *Melampus æqualis* lives 3—4 days in apparently a healthy state, immersed in sea-water, without coming in contact with the air.*

3. But dies in a few hours, immersed in fresh-water.†

I have before shown the inconclusiveness of any arguments that can

* Two large and vigorous specimens of *Helix lactea*, from Grand Canaria, placed in sea-water, immediately retreated deep within their shells, without an attempt to extricate themselves, and never protruded themselves again. At the end of eight hours they were quite dead.

† Two fine and healthy specimens of the same *Helix* were inclosed in bags and immersed in fresh-water. At the end of six hours they were nearly dead, and at the end of twenty-four completely so. Other smaller species do not usually survive so long.

be drawn from the preceding experiments, on the other side. Yet it may not be amiss briefly to recapitulate them, putting against each its contradictions, to set the matter in its clearest light.

The arguments tending to prove *Melampus* to belong to the *Pulmonea* or air-breathing *Mollusca*, are,

1. The habits of *Mel. æqualis* (Experiments 1 and 2.) are not what we should imagine to be those of a marine *Pectinibranchia*, living habitually in water.

Rendered inconclusive by the habits of *Littorina vulgaris* and other littoral *Mollusca*, decided *Pectinibranchia*, which are exactly the same. And *Melampus exiguus* has not these habits (Experiments 5, 6.) but remains at the bottom of the water.

2. Its surviving for six weeks in a box without water (Experiment 4.)

But it was in wet sponge; and besides, *Littorina vulgaris*, in the same box, did also survive. At all events, the anomaly is not greater than in the case of *Truncatella truncatula*. See Experiments 16 and 17.

3. Its not living more than 3—4 days immersed in sea-water.

Surely 3—4 days are enough, comparing it with the time that a *Helix* survives (see the two preceding notes;) but if not, seven out of eight specimens of *Pedipes afra* (a decided *Pectinibranchia*) survived no longer; the eighth lived two months immersed!

4. Its pectinated *branchiæ* are not visible.

But the small size of the species, not to mention want of instruments and skill in the dissector, sufficiently explains this.

5. The presence of the bubble of air at the mouth of the orifice in the mantle, &c.

This is caused only by the air accidentally received into the cavity of the shell, and amongst the *branchiæ*, when the animal has been some time out of the water; and besides, in *Melampus exiguus*, it is not constant; compare Experiments 6 and 7 with 5.

The following are the recent species which appear to unite generically under *Melampus* as above defined.

Testa obovata vel oblonga.*

1. *MELAMPUS ÆQUALIS*, nob. Tab. XIII. f. 1, 2, 3, 4, (5, the shell.)

Mel. testâ obovatâ, subventricosâ, obtusiusculâ, lævigatâ; anfractibus subæqualibus, planis; spirâ aperturâ breviorē; columellâ 3-plicatâ, plicis duabus inferioribus parallelis, æqualibus; labro simplici, (intus lævi.)

Long. $\frac{7}{8}$, unc.; lat. vix $\frac{1}{6}$. Anfractus 7—8.

a. testâ castaneâ, obscure subfasciatâ.

β.—— totâ albâ.

Hab. infra lapides, ad littus septentrionale Insulæ Maderæ.

In very numerous and fine specimens I have never seen in any stage of growth the slightest approach to the formation of striæ within the outer lip; or I should have suspected it to be an immature state of some species, perhaps of *Mel. Ovulum*. It answers well to *Voluta 3-plicata* of British authors, except that the aperture is not contracted.

2. *MELAMPUS GRACILIS*, nob.

Mel. testâ gracili, angustâ, elongato-ovatâ, acutâ, lævigatâ; anfractibus planis, æqualiter crescentibus; spirâ productâ, exsertâ, aperturâ longiorē; columellâ 3-plicatâ plicâ mediâ majore; labro simplici.

Long. $\frac{1}{4}$ unc.; lat. $\frac{1}{8}$. Anfr. $7\frac{1}{2}$.

Hab. in rupibus maritimis; ad littus meridionale Maderæ, prope urbem Funchal: v. m.

I possess only one perfect and one mutilated specimen of this shell, and it may very possibly prove only an elongated variety of *Mel. æqualis*. But though in young specimens of *Mel. æqualis* the middle tooth is also somewhat larger than the others, or more particularly than the lower one, yet the ventricose shape, and the proportions of the spire and aperture preserve constantly their characters.

3. *MELAMPUS FIRMINI*, nob.

Mel. "testâ ovato-turgidâ, albido-flavâ, transversim striatâ et pallidè fasciatâ; anfractibus planiusculis; spirâ brevi, apice fuscescente; columellâ triplicatâ; 4 lineas longa." Payr.

* Here and elsewhere by me the shell is placed in its proper and natural position in respect to the animal, i. e. with the spire downwards. In the specific characters taken from Lamarck, the contrary position is to be understood, viz. with the spire upwards.

Auricula Firminii, Payraud., Catal. p. 105, t. 5, f. 9, 10.

Hab. Corsica.

This species is indeed very nearly allied to *Mel. æqualis*. Yet in this last there is not the slightest trace of "transverse" (sc. spiral) striæ, the whole shell being quite smooth and glossy. It also differs remarkably in colour, and is a less slender and proportionally shorter, and more ventricose shell. But in a case of this sort it is hardly possible to decide without a comparison of specimens; and though at present, from the descriptions, the two appear perfectly distinct, it is possible that such a comparison may hereafter prove their identity.

4. *MELAMPUS OVULUM*, Schweig.

Mel. "testâ parvulâ, ovato-oblongâ, lævi, nitidulâ, castaneo-fuscescente; spirâ exsertiusculâ, acutâ; columellâ triplicatâ; lubro (simplici acuto) intus costâ transversali instructo, substriato." Lam.

"*Melampa ovulum*, Schweigger, Handb. p. 739." Féruss.

"*Bulimus ovulus*, Brug., Dict. No. 71." Féruss.

Auricula (*Conovulus*) *Ovula*, Féruss., Tabl. Syst. p. 104, No. 21.

Auricula nitens, Lam., VI., 2, p. 141, No. 13.

"*Voluta pusilla*, Gmel. et Dillw." auct. Féruss.

"*Voluta triplicata*, Donovan. Brit. Shells, IV. t. 138, Montag. and Dillw., auct. Féruss. Turt. Dict. No. 10.

Hab. "à la Guadeloupe," Lam. "Les Antilles, particulièrement la Guadeloupe, où Bruguière la dit fluviatile, ce dont nous doutons. Guernsey, selon Montagu," (i. e. *Voluta triplicata*.) Féruss., loc. cit. Cuvier, probably after Bruguière, says generally of his "*Melampes*," (including in the genus *Bulimus coniformis*, *monilis* and *ovulus*, Brug.) "Elles habitent les rivières des Antilles." I have very little doubt the present species is truly, like the rest, marine, though possibly found at the mouths of rivers.

5. *MELAMPUS PATULUS*, nob.

Mel. testâ obliquè oblongâ, obtusâ, anfractu basilari maximâ, elongatâ; spirâ brevi, exsertâ, aperturâ multò breviorè, et vix tertiam partem totius longitudinis excedente; columellâ 3-plicatâ; plicâ superiore inconspicuâ, obsoletâ, duabus inferioribus magnis, divergentibus, infimâ maximâ, prominente; mediâ ad superiorem minutam approximâtâ; aperturâ subauriformi, patulâ, superne obliquè dila-

tatâ ; labro simplici (intus lævi plano.)

Long. $\frac{7}{16}$ unc.; lat. $\frac{4}{16}$. Anfr. 4.

Hab. Australia. Mecum benevolè communicavit D^s. G. B. Sowerby.

Species incertæ ; huc forsan referendæ.

1. *Voluta livida*, Linn., Syst. ed. 12. p. 1187.

“ *V. testâ coarctatâ ovato-cylindricâ, spirâ subelevatâ obtusiusculâ, columellâ quinqueplicatâ.* M. L. U. 591, n. 229.*

Gualt. test. t. 25, f. B.

Hab. in Africa.

Testa livida fasciis transversis, pallidis obsoletis. Linn., loc. cit.

2. *Auricula Myosotis*, Drap.

“ *A. testâ ovato-conicâ (ovato-suboblongâ, Drap.) apice acuto, tenuiter striatâ, corneo-fuscescente ; anfractibus convexis ; columellâ triplicatâ ; labro margine albo, reflexo.*” Lam.

Auricula Myosotis, Drap., p. 56, t. 3, f. 16, 17. Lam., VI., 2, p. 140. Féruss., Tabl. Syst. p. 103, No. 8. Payr., Catal. p. 104.

Voluta denticulata, Montag. “ pl. 20, f. 5.” Turt., Dict. No. 2.

Voluta ringens, Turt., Dict. No. 3.

Hab. “ sur les côtes de la Méditerranée, sur le bois mort et pourri, dans les lieux humides. Note ; Quelques naturalistes distingués regardent cette espèce comme marine.” Drap. l. c. “ Dans le midi de la France, près des côtes de la Méditerranée sur les bois morts et pourris.” Lam. l. c. “ Les étangs saumâtres de la Méditerranée et de l’Océan, mais sortant de l’eau.” Féruss. l. c. “ Les bords des eaux saumâtres, ou les lieux recouverts par la mer dans les momens de tempête ; sous les pierres.” Payraud. l. c.

There can be little doubt that these two last are the correct habitats of the species ; and combining this with the fact of its identity with *Voluta denticulata* of Montagu, the preponderance of evidence is decidedly in favour of its belonging to the marine littoral *Pectinibranchia*.* But I have chosen for the present to refer it to the doubtful species of *Melampus*, because there seems reason to suspect that the shell is furnished with

* Férussac rightly remarks, that it is at least very doubtful whether the tentacula are rightly described as retractile by Draparnaud.

an epidermis ; a point, which in the absence of specimens, it is impossible to ascertain from the descriptions within my reach. Risso, indeed, positively ascribes one to it, i. e. to his *Auricula Myosotis* ; but he also does quite erroneously to his *Truncatella*, which invalidates his testimony, unfortunately, in the present instance. I am, however, strongly inclined to believe that this shell really has an epidermis ; and if so, it will then remain to ascertain whether the species agrees in all other points with the above generic character of *Melampus* ; in which case that character must be amended in respect to the supposed absence of an epidermis in all its species ; or, which is perhaps more probable, *Auricula Myosotis* may prove generically distinct from *Melampus*, as here defined.

3. *Voluta bidentata*, Montag., of which *Vol. alba* of Turton's Dict. No. 4, is the young shell, and possibly one or two other *Volutæ* of British authors, very probably belong also here ; yet without further evidence, it would be rash to decide ; and the following is mentioned only as an independent confirmation of their having been, as I believe, properly associated with *Auricula Myosotis* of Drap., and its allies, by the Baron de Férussac. In 1824, I met with *Voluta alba* of Turton's Dictionary, alive, in great abundance, under loose masses of rock and large stones, near low water-mark, at Obun, in Argyllshire, half a mile to the south of the Custom House. Having neglected at the time to take either drawing or description, I must be understood to speak with reserve as to this point ; but I have the strongest idea that both the animal and its habits were very similar to what is above recorded of *Melampus*. *Mel. exiguus* in particular, with its short, very obtuse, almost *clavate tentacula*, brought the animal of this *Voluta alba* very forcibly to my recollection.

** *Testa conoidea ; spira brevissima.*

6. *MELAMPUS EXIGUUS*, nob. Tab. XIII. f. 6, 7.

Mel. testâ ovali-turbinatâ, subconiformi, nitidulâ, striis exilissimis, obsoletis, confertis, spiralibus ornatâ ; columellâ 3-plicatâ ; labro intus costâ, margini parallêlâ, instructo, levi.

Long. vix $\frac{1}{16}$ unc. ; lat. vix $\frac{3}{16}$. Anfr. 5—6.

Castaneo-rufescens ; pallidiore subnebulosus.

Hab. rarior infra lapides ad littus Septentrionale Promontorii Ponta Sao Laureço dicti Insulæ Maderæ ; unâ cum *Mel. æquali*, *Pedipede afra*, et *Truncatella truncatula*.

7. *MELAMPUS CONIFORMIS*, Montf.

Mel. " *testâ turbinatâ vel obversè conicâ, basi attenuatâ, longitudinaliter*
" subrugosâ, albidâ, fulvo fasciatâ; spirâ brevissimâ; columellâ
" triplicatâ; labro intus dentato et sulcato." Lam.

Mel. coniformis, Montf., *Conchyl. Syst.* II. p. 319.

" *Melampa minuta*, Schweig., *Handb.* p. 739." Féruss.

" *Bulla coffea*, Linn., *Syst. ed.* 10, p. 729." Féruss.

Auricula coniformis, Lam., VI., 2, p. 141, No. 12. Féruss. *Tabl. Syst.* p. 105, No. 23.

" *Conovulus coniformis*, Lam., *Encycl. Méth.* t. 459, f. 2, a, b." Lam. and Féruss.

" *Bulimus coniformis*, Brug. *Dict.* No. 72." Lam.

" *Voluta minuta*, Gmel., *Syst.* p. 3436. Dillw., *Descr. Cat.* p. 506." Féruss.

Voluta coffea, Linn., *Syst. ed.* 12, p. 1187?

Hab. " en Amérique: fluviatile." Brug. " Les côtes de Cayenne, et principalement contre le rocher du Connétable, qui est en avant de la rade: marin." Montf.

Férussac says, only, that Bruguière "believed it fluviatile;" without noticing De Montfort's positive assertion, "Ce mollusque est marin;" and his equally positive and precise habitat.

8. *MELAMPUS MONILE*, Schweig.

Mel. " *testâ parvulâ, ovato-turbinatâ, lævi, nitidulâ, fulvâ, albo tri-*
" fasciatâ; spirâ brevi; columellâ biplicatâ; labro intus striato." Lam.

" *Melampa monile*, Schweig., *Handb.* p. 739." Féruss.

Auricula monile, Lam., VI., 2, p. 141, No. 14. Féruss., *Tabl. Syst.* p. 105, No. 22.

" *Conovulus monile*, Goldfuss, *Handb.* p. 657." Féruss.

" *Bulimus monile*, Brug., *Dict.* No. 70." Lam.

" *Voluta flava*, Gmel., *Syst.* p. 3436. Dillw., *Descr. Cat.* p. 506." Féruss.

" *Voluta*, No. 106. Schröter, *Einl. I.*, p. 272." Féruss.

Hab. " Les Antilles," Brug., Lam., Féruss. " Bruguière dit qu'on la croit fluviatile."* Féruss.

* But probably as erroneously as in the case of the preceding species, except he means at the mouths of rivers.

9. *MELAMPUS BULLA*, nob.

Voluta Bullaoides, "Montag., pl. 30, f. 4." Turt., Dict. No. 13.

Tornatella Bullaoides, Féruss., Tabl. Syst. p. 108, No. 7.

Species in Museo amici Dⁿⁱ. Clarke semel tantum visa ; ideoque characterem tentare vix ausim. A Faunâ Britannicâ species omninò rejicienda, utpote tantum "in Museo Portlandico reperta ;" nec unquam ab aliis Conchilegis in Britannîâ detecta. Sectioni forsan priori melius referenda.

Species incertæ ; huc forsan spectantes.

1. *Auricula (Conovulus) Fabula*, Féruss. Tabl. Syst. p. 105, No. 24.

"Hab. L'Isle de France. Muséum, No. 303, bis. Très jolie petite coquille qui se rapproche des suivantes par la bordure interne et saillante, en côte longitudinale, du bord extérieur de son ouverture." Féruss. l. c.

2. *Auricula Felis*, Lam. VI., 2, p. 138, No. 5.

"*A. testâ ovali, crassiusculâ, transversim striatâ, rufo-fuscescente ; spiræ brevissimæ anfractibus planiusculis ; aperturâ medio angustatâ ; columellâ triplicatâ.*" Lam. l. c.

Auricula (Cassidula) Felis, Féruss., Tabl. Syst. p. 105, No. 25.

"*Bulimus Auris Felis*, Brug., Dict. No. 77." Lam.

"*Voluta Coffea*, Dillw., Descr. Cat. p. 505." Féruss.

"*Voluta Coffea Linnæi*, Chemnitz, tom. II., p. 43, t. 121, f. 1043, 1044." Féruss.

Hab. "Cette espèce selon Chemnitz vit dans les mers des Grandes Indes. Il dit qu'on l'a aussi trouvée dans les mers du Sud, pendant les voyages de Cook ; Lister la dit des Barbades. Olivier en a rapporté un exemplaire de la Perse, qui est au Muséum." Féruss.

"Cette coquille n'est assurément point marine, ce que constatent les bords bien réfléchis de son ouverture ; mais elle est terrestre comme ses congénères." Lam.

But this strange theoretical doctrine of Lamarck's is scarcely enough to overturn Chemnitz's positive information, more particularly when the general theory itself has long since shared the fate of most others of the same writer.

3? *Auricula Nucleus*, Féruss., Tabl. Syst. p. 105, No. 26.

"*Helix Nucleus*, Gmel.; Syst. Nat. p. 3651."

Martyn, Univers. Conch. tom. II., tab. 68, fig. exter.

a) Knorr, Vergn. tom. VI., tab. 17, f. 9.

Hab. Otaiti, Martyn.

"On ne connaît point les animaux des deux espèces de ce groupe, qui ont une forme si remarquable. Tout porte cependant à croire qu'elles sont du même genre que celles des groupes précédents." Féruss. l. c.

It is very possible that several species associated with *Tornatella*, from which, however, they are distinguished by the thickness and solidity of their shells, together with a certain smoothness of surface, uniformity of colour, and habit, may hereafter be found to rank under the present genus, e. g. *Tornatella nitidula*, Lam.

Auricula Dombeiana, Lam., and *Voluta fluviatilis* and *fluminea*, Maton, with other truly fluviatile species, will probably be found, when their animals are known, either to form a genus of themselves, as suggested by Sowerby, or at least not to unite generically with the *Melampodes*.

It only remains to point out how *Melampus* is distinguished from the several genera with which it is most likely to be confounded. It differs from *Auricula* (taking *Aur. Mida*, *Juda*, &c. as typical species of that genus,) in being one of the *Marine Pectinibranchia*; while in respect to those species just mentioned, the evidence at least preponderates in favour of their belonging to the Land *Pulmonea*. Should they also be found hereafter to have *four* tentacula, it is possible they may be united to the *Helices*, as Férussac has already done with *Auricula Sileni*, *auris leporis*, *bovina*, and *caprella* of Lamarck; in which case the genus *Auricula* will be left without a single representative, *Aur. minima* having been long ago by Müller called *Carychium*, and *Aur. Scarabæus*, Lam., having also been separated by Férussac, under the name of *Scarabus*, and having, like *Carychium*, only two tentacula. If they prove to have two tentacula, and be really at the same time terrestrial *Pulmonea*, which is perhaps the most probable supposition, the genus *Scarabus* of Férussac may perhaps merge into one with them; for which the name *Auricula* should unquestionably be preserved. And in either case, the name *Au-*

ricula as clearly belongs to those shells which were its original typical species, as that of *Melampus* does to the shells here associated under it, and must stand or fall with them. Yet it may be said, take away these two species, and this genus *Melampus* is identical with *Auricula*, Féruss.* Be it so; but on the other hand, be it remembered, that *Auricula Myosotis* (at best only a doubtful species) will then be the only species left which was included in the genus *Auricula* by its founder, Lamarck; and even this, a species perhaps scarcely contemplated by him at all in its original formation, as he clearly meant *Aur. Midæ* and *Judæ* to be its typical species; while *Melampus*, i. e. *Conovulus*, Lam., has a much more extensive claim over the remaining species. Besides, it is the claim of *Auricula* of Lamarck, be it recollected, not that of *Auricula* of Férussac, which is the subject of discussion. The former should clearly go along with the shells contemplated by Lamarck; the latter must, at present, yield precedence to the prior claim of *Melampus* of Montfort. I say at present; for if (though I think it improbable from the presence of an epidermis on the shells, and other circumstances) the animals of *Aur. Midæ* and *Judæ* should be found hereafter perfectly identical with those of this genus, I shall then be quite willing to allow the prior claim of *Auricula* to the name here adopted.

It may be farther objected, that there is still a want of evidence to prove the coincidence of the generic group above defined with De Montfort's *Melampus*, since its characters are drawn up from two species never contemplated by him. Yet, if all reliance on the similarity of shells as affording grounds for generic association, be not altogether given up, there can be no doubt that his *Melampus coniformis* belongs to the same genus as *Mel. exiguus* of this paper, and therefore as *Mel. æqualis*. It is an additional argument for their generic affinity, that De Montfort says positively, (and in the face too of Bruguière, who, according to Férussac, believed it fluviatile) "Ce Mollusque est marin, il vit sur les côtes de Cayenne, et principalement contre le rocher du Connétable qui est en avant de la rade." Conchyl. Syst. II., p. 320.

To return from this digression; any thing indeed but a brief one.

* M. le Baron de Férussac himself originally distinguished "les Conovules" de M. de Lamarck" (our *Melampodes*) from "les vraies Auricules." See Tabl. Syst. des Limaçons, p. 14.

The absence of an epidermis is the strongest character ; but besides this, the want of decussating striæ, and of an expanded outer lip, may also serve perhaps to distinguish the shells of the *Melampodes* from those of the true *Auriculæ* ; and all the species of the former at present known are much smaller shells than these *Auriculæ*. From *Tornatella*, the characters of the animal abundantly distinguish it ; the absence of an operculum, shape of the tentacula, and foot, &c. It is more difficult to speak about the shells, till the limits of *Tornatella* itself be more strictly defined ; but it does not seem improbable that that name should be confined to those shells which, like *Torn. fasciata*, the typical species, are of a thin substance, having a regularly striated surface, and a variety of coloured markings, whether bands or spots, in which case, the thick solid substance of most of the species, their nearly smooth surface, and simplicity of colouring, will distinguish the *Melampodes*. Their short spire, oval or turbinate shape, and lengthened aperture, distinguish these shells from *Pyramidella*, to which, however, they appear to have considerable affinity. Yet in our ignorance of the animal of *Pyramidella*, nothing here, indeed, can be positively affirmed. They cannot, however, be confounded with *Voluta*, &c. from wanting altogether a notch at the top of the aperture ; and this last particular also excludes from the genus a singular little shell, whose animal is yet unknown, namely, *Marginella auriculata* of Menard de la Groye, discovered in the Mediterranean ; though this remark more properly belongs to the following genus *Pedipes*, to which this shell is said to be more nearly related.

Class. GASTEROPODA.

Order. PECTINIBRANCHIA.

Fam. PLICACEA.

Genus. PEDIPES, *Adans.*, *Féruss.*; *Tornatellæ* species, *Lam.*;
Helix, *Gmel.*, *Dillw.*; *Bulimus*, *Brug.*

TAB. XIII. f. 8, 9, 10, 11 ; f. 12 shell (*Ped. afra.*)

Omnia ut in *Melampode* ; præter pedem duplicem, obversè soleæformem, sc. in duas partes, sulco transversali distinctas, divisum. Pars anterior latior quàm longa, transversa, anticè rotundata : posterior major, longior quàm lata, anticè truncata, posticè subattenuata, obtusa, brevis, semiovalis. Operculum nullum.

Testa solida, ovalis, striis spiralibus sculpta, unicolor. Spira brevis. Apertura ringens, superne integra. Epidermis nulla.

Animal littorale, revera marinum, et branchiis spirans.

The remarkable shape of the foot, inducing a corresponding peculiarity in the mode of crawling, (well described by Adanson), is the sole external character by which the animal of the present genus is distinguishable from *Melampus*. Yet this character, combined with those of the shell, is surely enough to warrant their separation. I am indeed inclined to believe, that the different modifications in shape of the foot, will, in many cases, be found to afford valuable aid, to a more natural and scientific arrangement of the marine *Gasteropoda* into genera, than the present state of our knowledge permits.

The genus *Pedipes* was founded long ago by Adanson; and both its animal and shell are admirably and correctly described by him. Yet Bruguière united it with his *Bulimi*; and Lamarck has confounded it with *Tornatella*.

The species from which the above description and accompanying drawings were made, I once considered distinct from Adanson's species: but a careful comparison with his description (his figure is somewhat rude and incorrect) has satisfied me of its identity; the only difference being in the number of volutions, which in my specimens are 4 or $4\frac{1}{2}$ instead of 6, and in the aperture being twice as long, instead of "un peu plus long que le sommet." It occurs mixed with *Melampus æqualis* and *exiguus*, but in far greater profusion, under stones upon the beach, on the north side of Pta. Saõ Laurenço; the eastern point of Madeira.

That it truly belongs to the *Pectinibranchia* has never been doubted, and is indeed beyond all question. From a number of experiments, conducted simultaneously, and with a similar view to those above recorded of *Melampus*, upon specimens brought from the same spots and found under the same stones with *Melampodes*, I shall only select the following.

Experiment 14.

- July* 19. Two specimens of *Pedipes afra* inclosed in separate bags, and each immersed in a glass of sea-water.
- 20. Both alive and healthy.
- 21. One quite lively, the other sickly and retracted. Water changed with both.

- July* 22. Sickly one dead and putrid ; the other quite healthy.
 — 24. The survivor quite healthy ; water changed.
July 27. Ditto ditto.
 — 30. Ditto ditto.
August 3. Ditto ditto.
 — 10. Ditto ditto.
 — 16. Ditto ditto.
 — 26. Ditto ditto.
 — 30. Ditto ditto.
 — 31. I went from home, leaving it in the care of a friend.
Sept. 17. Water changed ; the animal being alive. A few days after
 this, the water was observed to be cloudy, and the
 animal was found dead and putrid.

This is quite conclusive ; and the animal's surviving so long as 6, 7, and 10 days without even a change of water, leaves not the smallest possibility of cavil. Yet this is the last of a series of experiments so similar in every point to Nos. 1, 2, 3, 8, 9, 10, 11, 12, and 13 of those above recorded of the *Melampodes*, that it is only necessary to substitute the word *Pedipes* for *Melampus* in them as they stand. *Pedipes* has the same habit of remaining fixed *above* the surface of the water, and of crawling out of the glass if left at liberty to do so ; has a precisely similar orifice in the mantle on the right side, which it opens when taken out of the water ; has always the air-bubble at the mouth of this orifice when beneath it ; and except in one instance (Experiment 14) has always died on the third or fourth day of confinement below the surface. Setting then aside one instance, there is no stronger reason to prove that *Pedipes* belongs to the *Pectinibranchia* than that *Melampus* does. Yet this single instance fortunately removes all farther question as to *Pedipes* ; and all this serves to corroborate the same decision respecting *Melampus*.

Férussac enumerates four species of *Pedipes* ; but his third, *Ped. Ovulus*, seems from his short remarks upon it scarcely to belong to the genus ; for he describes it as smooth and polished, and wanting the internal rib or double tooth within the outer lip. In Mr. Sowerby's rich cabinet, I have also seen two species of the genus, both apparently distinct from *Ped. afra* ; and these, as well as the rest of Férussac's species agree in the presence of the spiral *stræ*, and the rib-like tooth or fold inside the outer lip.

The truncature of its *columella* excludes also from this genus *Margi-nella Auricula* of Menard de la Groye, (*Marg. buccinea*, Risso, Hist. Nat. IV. p. 232, and also identical according to Férussac with the fossil *Auricula ringens* of Lamarck,) see Féruss. Tabl. Syst. de la Fam. des Auricules, p. 109.

Class. GASTEROPODA.

Order. PECTINIBRANCHIA.

Fam. PALUDINIDÆ.

Genus TRUNCATELLA, *Risso*; *Cyclostomatos* species, *Drap.* et *Lamarck*; *Paludinæ* species, *Payraud*; *Turbo*, *Mont.*, *Turt.*, &c.

Tentacula (2 contractilia) cylindrico-conica, brevia, obtusa, basi distincta, proboscide separata; oculis sessilibus paullo supra basis angulum externum positus.

Caput probosciforme exsertum. Os ad extremitatem proboscidis cylindricæ, inter tentacula exsertæ, disciformem, supra emarginatam, (sc. bilobam, ob buccas labiales in proboscidem ipsam coadunatas vel commutatas.)

Pallium collare siphone nullo; orificio ad dextrum corporis, ut in *Helice*, *Melampode*, *Pedipede*, &c.

Pes rotundatus vel ovalis, brevis, minimus, posticus.

Operculum corneum simplex, i. e. non spirale, ovale, aperturam testæ omninò claudens..

Testa turrita; adulta cylindrica, decollata vel truncato-obtusa: anfractibus distinctis, vel lævibus vel transversè costatis. Apertura ovalis, brevis; peritremate continuo. Labrum simplex. Epidermis nulla.

Animal littorale, amphibium, sed revera marinum et branchiis spirans. Ingrediendi, discus terminalis proboscidis pro pedis parte anticâ servit: itaque modo ferè larvarum Phalænidarum Geometrarum gradibus alternis incedit. Testa junior, tereti-acuminata, è pluribus anfractibus quàm adulta constat: prioribus in plerisque demùm (ut in *Hel. Bulino decollato*) defractis, truncata evadit.

It is now nearly three years since the acquisition of a single live specimen of *Cyclostoma truncatulum*, *Drap.*, and a long and continued observation of its animal, convinced me that it was entitled to rank as a distinct genus from any which were then constituted. I had accordingly

designated it in my MSS. by the generic name of *Erpetometra*; derived from its peculiar manner of crawling. This appellation I had since purposed changing into *Truncatella*: the very name by which I find the self-same species designated by Risso, in his *Histoire Nat. &c. de l'Europe Meridionale*. In this work, however, the genus rests, like very many others of the same writer, on most unsubstantial grounds; the animal being entirely neglected. The name therefore being settled by Risso's priority in publication, nothing remains but to supply the last mentioned deficiency; and to indicate the species that will probably be found to agree in the above characters.

The following extracts are made more with the view of confirming the marine nature of *Melampus*, than to settle the question in respect to the present genus; whose proper abode does not seem to have been so much a subject of doubt.

Experiment 15.

April 28, 1827. A single specimen of *Cyclostoma truncatulum*, Drap., found alive on the north coast of Ponta Saõ Laurenço, under large stones on the beach, a little below high-water mark; in company with specimens of *Melampus aequalis*, *Mel. exiguus*, and *Pedipes afra*. Within the aperture on the right of the neck, as the animal is crawling, there is an air-bubble.

Experiment 16.

June 5. Having opened to-day the small tin box in which I had deposited on *April 30* this same shell, together with a number of specimens of *Melampus aequalis*, *Mel. exiguus*, and *Pedipes afra* found with it, on placing them all in a glass of sea-water, to my great astonishment the animal of this specimen began instantly to protrude itself, and crawled actively about the glass. It does not seem to have suffered in the least from its long confinement without water. All the others are quite dead. "Is it then a *Pulmonia*?" MSS.

The following statement sufficiently negatives this last question.

Experiment 17.

June 9, 1827. I inclosed this same specimen in a small lace bag, previously soaked to exclude any air-bubbles, and immersed

it completely with the inclosed animal in a glass of sea-water. For a whole fortnight, I attended to it with the greatest care, changing the water only twice, and then pouring the fresh in so as to renew it without pouring off the old. It is therefore quite certain, that for the whole time the animal never was for a moment in contact with the atmospheric air. It did not appear to be suffering the slightest inconvenience. Since that time to the present, *August 14*, 1827, it has remained in the bag constantly immersed; and though I have not attended so particularly to it since the first fortnight, I can be very confident that it has never been above the surface, since the water has always been changed by myself, and in the manner before described. Sometimes the water has not been changed at all for a whole fortnight; once, not for three weeks; and latterly I have never thought of changing it above once in a week or ten days. Since the 9th of *June*, it has had no nourishment but what the water afforded. It has been perfectly healthy the whole time; when the water is fresh, crawling up to the upper part of the bag, and remaining there nearly stationary, with its head and body exerted, till the water becomes very stale, when it falls generally to the bottom, and retreats within its shell, lying apparently (as I have often thought) dead. I can never see any bubble of air within the aperture now.—*Sept. 17.* The water was changed by another person; and the next day I found the animal out of the bag (which had become quite rotten) and lying at the bottom of the water. It is alive; and having given it fresh sea-water, it begins to crawl as usual, and is apparently as strong as ever. It is now left at liberty in the water. About the middle of *November* (exact day not noted), I found it lying at the bottom of the water, dead. It had for some time previously (since left at liberty), kept itself affixed to a cover placed over the glass, out of the water for the most part; as *Littorina vulgaris* usually does.

This last experiment proves beyond all farther question that the animal

is one of the marine *Pectinibranchia*: and what is equally satisfactory, greatly strengthens the same conclusion respecting *Melampus*. And were this conclusion less definitely proved in the present instance than it really is by this Experiment 17, it would not be affected by the fact, that the same individual was able to exist in atmospheric air, as above related (Experiment 16), for nearly five weeks. For although this might well happen to an aquatic animal shut up in a close box with other aquatic species, even when the others did not survive,* still, I apprehend, the converse cannot hold; viz. that an atmospheric air-breathing *Molluscous* animal could exist a fortnight, or even much more than twenty-four hours, immersed in sea-water. However, this *Truncatella* really lived fourteen weeks so immersed.

SPECIERUM CONSPECTUS.

1. TRUNCATELLA TRUNCATULA, TAB. XIII. f. 13, 14, 15, 16, 17, (18 testa. var. β .)

Trunc. testâ subpellucidâ, solidiusculâ; anfractibus plus minus transversè striatis.

Long. (in adulta) 2-3 lin.; lat. $1\frac{1}{4}$. Anfr. 4.

Cyclostoma truncatulum, Drap., p. 40, no. 17. Lam., VI., 2, p. 149.

Helix subcylindrica, Mont., Test. Brit., p. 393, no. 17.

a lævigata; testâ corneo-lutescente, lævigatâ; striis obsoletis, vel ad suturas tantùm conspicuis.

Truncatella lævigata, Risso, Hist. IV., p. 125, no. 300, f. 53.

Cyclostoma truncatulum γ ., Drap., loc. cit. t. 1, f. 31.

β *costulata; testâ carnea; anfractibus costulatis, costellis crebris æquidistantibus flexuosis subobliquis distinctissimis.* TAB. XIII. f. 13—18.

Truncatella costulata, Risso, Hist. IV. p. 125, no. 301, f. 57.

Cyclostoma truncatulum, α & β , Drap., loc. cit. t. 1, f. 28, 29, 30.

Testa junior β .

Paludina Desnayersii, Payraud., Catal. p. 116, no. 245, t. 5, f. 21, 22.

* Yet in another similar instance, one of them, *Melampus æqualis*, and the undoubtedly aquatic *Littorina vulgaris*, did, after a confinement of about the same length. See Experiment 4, above.

Hab. Var. β infra lapides in littore septentrionali Insulæ Maderæ; v. v.— α et β in littore Maris Mediterraneæ, Draparnaud, Lamarck, et Payraudeau, loc. cit.—v. m. e Museo Dni. Sowerby.

2. *TRUNCATELLA CLATHRUS*, Nob.

Trunc. testâ subpellucidâ, solidâ, pallidè corneo-lutescente; anfractibus costis magnis raris æquidistantibus elevatis transversis sculptis, per totam testæ longitudinem decurrentibus.

Longit, 2 lin.; lat. 1. Anfr. 4.

Hab. ———? E Museo amici et cel. G. B. Sowerby.

3? *TRUNCATELLA MONTAGUI*, nob.

Trunc. testâ tenui angustâ, lineari, spirâ obtusissimâ apice abruptâ quasi truncatâ; suturâ distinctissimâ, valde coarctatâ.

Long. $1\frac{2}{3}$, lin.; lat. $\frac{2}{3}$ lin. Anfr. $4\frac{1}{2}$.

Turbo truncatus, Mont., Test. Brit., "pl. 10, f. 7." Turt., Dict. no. 65.

Testa junior?

Turbo subtruncatus, Mont., "pl. 10, f. 1." Turt. Dict. no. 64.

Hab. in littore Britannico, v. m.

The young shells in this genus differ so remarkably in form from the adult, that they have occasionally been described as distinct species. One of the species, (adult), is placed by Lamarck among his *Cyclostomata*, though it is but fair to add as a doubtful species. Yet there can be no doubt, if it belong to any of his genera, it should be placed in *Paludina*; whither in fact Payraudeau has properly removed it. Indeed it is to *Littorina* that *Truncatella* bears the greatest affinity in the structure of its animal. Yet the very peculiar modification of this structure, joined to the singular habit, mode of crawling, &c. is surely sufficient to distinguish them. Added to this, the shells differ in their cylindric decollated or truncated spire, and transversely striated and sculptured (or at least with a tendency to be so) volutions. The same characters, with the additional one of the absence of lateral membranes on the body of the animal, and the want of an epidermis to the shell, distinguish them from the true fluviatile *Paludina*. And the rounded shape of the foot and proboscidiiform muzzle essentially separate them from *Rissoa*: in which at present imperfectly defined genus, all the species which have come under

my observation have an elongated foot, truncated in front, and attenuated behind; the head and muzzle not probosciform, and the tentacula long and filiform, seated on each side the head or neck much as in *Helix*. The absence of an epidermis, and the plain (not spiral) operculum distinguish the shells from the *Melaniæ*, to which indeed they have in sculpture, shape and outline considerable resemblance: and it is probable, that when the animal of this last named genus shall be accurately made known, *Truncatella* will bear the same relation to it that the marine *Littorina* does to the true fluviatile *Paludina*. With *Cyclostoma*, it has no connection whatever, except in the way of analogy.

Funchal, Madeira.

Nov. 14, 1829.

EXPLANATION OF PLATE XIII.

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- Fig.* 1. Animal of *Melampus æqualis* a. natural size; seen from above.
 2. Ditto seen beneath, as crawling up a glass.
 3. Ditto seen from above.
 4. Ditto seen beneath; shewing the details of the open mouth, the upper jaw, &c.
 5. The shell.
 2, 3 and 4 all more or less magnified.
 6. Shell of *Melampus exiguus*.
 7. Ditto.
 8. Animal of *Pedipes afra*; natural size.
 9. Ditto seen beneath; shewing the double foot as it appears when the animal is in the act of drawing up the posterior portion to the anterior: the space or hollow between these never appears wider than here represented.
 10. Ditto shewing the appearance of the foot when at rest.
 11. Ditto seen above when crawling.
 12. The shell.

9, 10 and 11 all more or less magnified.

13. Animal with shell of *Truncatella truncatula*, β .; side view.
 14. Ditto seen beneath as crawling up a glass; taken when the muzzle is exerted.
 15. Ditto ditto.
 16. Ditto ditto, when the foot is extended in the act of drawing up the shell.
 17. Ditto seen from above; a portion of the foot is also seen.
 18. The shell.
- 13, 14, 15, 16 and 17 all more or less magnified.

ART. XL. *On the internal structure of Helicolimax (Vitrina) Lamarckii. By the Rev. M. J. BERKELEY.*

A FULL and minute account of the habits and external characters of this interesting animal has already been given in the Zoological Journal by my friend Mr. Lowe, who has furnished the specimens upon which the following observations were made. But as he has not entered into any anatomical details, some further account of the internal structure may perhaps not be unacceptable, though, from the small size of most of the specimens, that which I have to offer is necessarily imperfect.

Of course, as I have nothing to add with respect to those characters which Mr. Lowe has so accurately given, it would be superfluous to make any mere repetition here. I shall therefore proceed at once to the anatomy, considering the present notes as a supplement to Mr. Lowe's paper.

The pulmonary cavity, is so similar to that of *Helix*, and the different organs disposed so nearly in the same way, that it is needless to give any figure or description. On the right side as usual is the *rectum*; on the left behind, the *pericardium* with the heart within, consisting of an *auricle* and *ventricle*; and itself situated beneath the slime bag. The membrane which forms the vault of the cavity, and over which the

different vessels which expose the blood to the action of the air, are spread, is so extremely transparent that a clear view is obtained of the contents of the cavity without making any incision; it has (at least in specimens preserved in spirits) a slight degree of rigidity and elasticity, like the shell which protects it; and perhaps this circumstance compensates in some measure for its extreme thinness. So much is this the case, that even when the shell is removed, it is able in general to support itself without falling down like the flaccid membrane of *Pulmonifera* in general.

The mass of the mouth is oval, and has the upper lip furnished with a horny crescent-shaped plate, which has a single projecting tooth in the center as in *Limax*, and not numerous toothlets as in *Helix*.

The mass itself has a flat forked muscular strap shaped like the letter Y, attached to it behind, embracing its under-side firmly with the two arms, which shortly after become confluent, and the single strap formed by this confluence is inserted into the foot behind. By means of this muscle the mass is retracted, together with a portion of the skin immediately surrounding the mouth itself. Above the muscle between its arms, the cartilaginous cone of the tongue makes a slight projection. The tongue itself which lines the bottom of the cavity of the mass, or rather of an organ fixed to it, which performs the function of a lower lip, is most beautifully and regularly chequered in parallel, transverse and longitudinal lines, formed by most minute subtriangular plates or spiculæ, whose points are directed backwards exactly as in *Helix* (*aspersa*.)

Immediately above the cone is the commencement of the œsophagus; on each side of which the salivary ducts enter into the mass; and above these the upper ganglions of the nervous cord, for the mass is evidently formed of two confluent ganglions; each gives off a nerve to the large tentaculum on its own side; and above a nerve forked soon after its origin proceeding to the upper part of the mass of the mouth. The lower ganglion, connected on each side by a cord with the central ganglions is large and nearly circular, giving off nerves on all sides, as in *Helix*. The œsophagus, as usual, passes through the circle formed by the junction.

The œsophagus is soon confounded with the stomach which is a membraneous dilatation, consisting of two parts. The salivary glands

which are flat, and but little divided, clothe the upper portion completely, so as to divide the lower portion by an accurately defined line. When the mass of the mouth is drawn inwards to the fullest extent, the upper portion of the stomach is greatly contracted, and enters into the lower by a sort of intromission, much in the same manner as the proboscis of *Buccinum undatum* is retracted. In this state it is represented at fig. 2 & 3. But when the mass is not so strongly retracted, the upper portion becomes in proportion more extended, and only a small part is then inclosed within the lower part of the stomach. Whether or no the whole of the upper portion is drawn out when the animal is in its full state of extension, as for instance, when it feeds, or whether the intromission takes place only when it contracts itself, to take refuge within its shell, either wholly, or partially under the large expanse of the corselet, I am unable to decide, not having a sufficient number of specimens to examine this point under different circumstances. I have not, however, seen any case in which it did not exist in a slight degree, as in fig. 4. When it takes place, it is at the expence of the upper portion of the stomach, the line defined by the termination of the salivary glands being that from which it commences.

There is no marked distinction between the lower portion of the stomach and the duodenum; but the latter is simply a continuation of the former, gradually diminishing in diameter; the intestine suddenly changing its course and running back again for a short distance, almost parallel with the stomach as in *Helix*, though with no indication of a cæcum; and after two turns, one above, and another below, passing along the outer edge of the pulmonary cavity. It is nearly even throughout. The coats are not furnished with any remarkable ribs or wrinkles, but that of the upper portion is slightly thicker than the rest.

I was not able to trace accurately the lobes of the liver, except the large one, which in conjunction with the ovary fills the spire, and is precisely as in *Helix*, and so as far as I can judge are the others; I conceive they pour in the bile at the commencement of the duodenum, but I could not demonstrate this point.

The organs of generation have their orifice behind the right larger tentaculum, and both are united in the same animal. From the ovarium the oviduct is given off, which after curling more or less from right to

left, passes towards the upper part of the great lobe of the testicle into the matrix, which is a long sac variously puckered and folded, exactly as in *Helix*; this at the extremity gives off a thread, which enters into a strong elliptic muscular body at one end of it, and this again enters by a narrow neck, on one side, into the bottom of the pouch in which also the male organ has its external orifice. The walls of this last pouch are marked with faint transverse furrows. At the same point also as that in which the matrix enters into the muscular body, the tube of the "vessie" also is inserted. This is short, and the "vessie" itself is situated almost at the top of the matrix. It is not very clear what is the use of so strong a body as that into which these organs enter together, except it have some power of causing an inversion of the neck by which itself is inserted into the outward pouch. I was unable to ascertain its internal structure, as I had but a single specimen in which the organs of generation were in a full state of developement.

The lower portion of the testicle is shaped like an egg cut through its major axis; on the flat side at the point where the oviduct enters the matrix is a small lobe; the testicle is continued in a fine line along the matrix, and at length at the top of the matrix gives off the vas deferens which after twice or thrice passing from right to left, and from left to right enters at one side towards the base into the bulbiform penis, which is placed at the base of the external pouch, and is continued through this, which it perforates by a tube which is adnate with the walls of the pouch on one side, in such a manner, that the bottom of the pouch hangs a little way down the top of the bulb like a little flap all round, except on the side on which the tube is adnate, for there the external surface of the pouch and bulb are perfectly continuous; hence looking at the pouch and bulb externally a distinct line is seen about three parts round dividing the sac formed by the two, which externally is apparently one, into two portions. A correct notion of its structure may be formed from conceiving the neck of a Florence flask passing through the bottom of a common wine bottle, the neck being applied in its whole length to one side of the bottle; and the hollow base of the bottle resting upon the top of the bulb of the flask. The bulb consists of a double coat, the inner being the thickest, and (probably by means of the structure of these coats) can reverse itself so as to pass through the above mentioned tube, and is drawn back

again at pleasure, by a muscle attached to it behind. It is at the base, where the tube of the bulb perforates the external pouch, a little up on one side, that the orifice of the tube leading from the muscular organ of the matrix is inserted. The structure of the whole will be understood without difficulty from the figures. At fig. 8 the penis and the pouch through which it passes are laid open, so as to shew their structure within.

It is impossible without having an opportunity of seeing living specimens to understand exactly the limits of inversion of the different parts; nor indeed even in *Helix* does this point seem to have been much studied, from the difficulty of doing it with success. I have merely described the structure, such as I was able to observe it in specimens preserved in spirits, and therefore probably in almost an unnatural state of contraction.

It remains that I compare the structure with that of the neighbouring genera. Mr. Lowe remarks its near relation with *Parmacella*. To this conclusion I had arrived, independently, from the consideration principally of the anatomy. Indeed, in external characters alone, the resemblance is too striking to escape notice, and this will be found confirmed by the internal structure. De Férussac has long ago remarked the extreme resemblance of *Parmacella* to some *Helicolimaces* (Vitrinæ).

First then, compared with *Helix*, we find the pulmonary and nervous* systems almost identical. The mass of the mouth, tongue, and its main retractor muscle are the same in both. The tooth alone differs slightly. With respect to the stomach, there is in *Helix* a tendency in this part to put on the form of a double stomach, insomuch that some authors have so described it; the structure in *Helicolimax* is only a step beyond this; for there is no great difference in the thickness of the coats of the two portions, and indeed when the upper portion is fully drawn out, the difference is the least possible. Besides in *Helix* the salivary glands, which are very similar to those of the present animal, end just at the point where the slight strangulation of the stomach takes place. I am of course not at liberty to assume the similarity of the liver, or position of

* I did not observe the ganglions under the origin of the *œsophagus* which exist in *Helix* (in *Hel. aspersa* there are two), but this arose perhaps from my attention not being directed particularly to that point.

the biliary duct, though I have no doubt that they are the same in the two. The general appearance and comparative length of the rest of the intestine are nearly the same.

Again, with respect to the organs of generation we have the ovary, oviduct, matrix and "vessie"* the same, only the common receptacle of the two last is become stronger and more muscular. The testicle and vas deferens again are precisely the same. The principal points in which the two genera differ, are, that there is no process of the dart as in *Helix*, except better opportunities of investigation should prove that the muscular body above mentioned, serves this purpose, in addition to its other functions, but even then its position would be widely different; there are also no multiplied processes or any appendages; and the body of the penis is bulbiform, instead of flagelliform; and its general structure is described above somewhat varied.

With *Parmacella* it agrees in almost every point, except that it has no appendages to the penis; that it has not the additional ganglion marked t. . in Cuvier's figure of *Parmacella*, and that in *Parmacella* there are two distinct muscles for the retraction of the mass of the mouth, instead of one. Cuvier has not indeed given any account of the interior of the organs of generation, but the outward appearance is so similar

* In *Helix aspersa* there is another organ besides the "vessie," whose use I am unacquainted with, equally as with that of the "vessie" itself. I have not been able to examine the *Helix Pomatia*, from which Cuvier's dissections are taken, and cannot therefore say whether it exists in that also, but conclude that it does not as he takes no notice of it, nor is there any indication of it in the figures: in *Helix aspersa* it is so prominent as to strike any one immediately who is tracing the course of the tube which leads to the "vessie." Not only is there a tube given off from the point where the matrix enters the common cavity, to bear the "vessie"; but this tube at some distance from its origin is forked, and one of the divisions, that of the "vessie" on the right hand, the smaller of the two, runs along the side of the matrix opposite to that which bears the narrow portion of the testicle, while that on the left, after curling about twice or thrice, at length is attached to that portion of the testicle, at about the middle of its course, accompanies it almost to the end of the matrix, and there ends obtusely, forming (as it were) a sort of cæcum to the tube of the "vessie."

that in the total absence of any evidence to the contrary, we may assume the structure to be the same. Again in *Parmacella* there is a slight strangulation of the stomach, but on the whole there is a less perfect resemblance as regards the salivary glands, their form, the point to which they extend, and indeed in the general course of the intestine than in *Helix*. As the shell of *Parmacella* is not spiral, of course we must expect corresponding differences as regards the lobes of the liver, one of which is so strongly affected by any change of form in that point. *Helicolimax* is nearer then to *Helix* as regards the digestive organs; nearer to *Parmacella* as regards the generative.

With respect to outward structure, *Helicolimax* is intermediate between *Helix* and *Parmacella*, but with respect to internal, *Helix* would be intermediate as regards the digestive organs; while *Parmacella* would be intermediate as regards the generative organs.

Whence this curious result arises, that each in one important point will take a middle place. Hence in the same animal two opposite ends are carried on, in the simplification of one important function, and the complication of another. But this takes place not merely by the intervention of a single animal but by an interchanged relation.

It would have been interesting to have compared the three genera with respect to the nervous system, but I have not sufficient data to go upon, and it could be only done by examining the three together for the express purpose, with the greatest attention, and with every advantage of numerous specimens.

I do not mean to say that these are the only genera with which *Helicolimax* may be compared, but merely that to these it is related most nearly.

Helicarion would most likely prove to be almost the same in structure. Of the genera whose structure is described, it is with these it has the nearest affinity. From *Testacellus* it differs especially, in the far lower developement of the retractor muscle of the mouth, which should seem to prove that if it be essentially carnivorous, it is so in a different way. The stomach in *Testacellus* is well marked and simple, and the generative organs still less complex. It is much more nearly related to *Limax*, but *Limax* or rather *Arion* (for of that alone the anatomy is given in Cuvier's Memoires) is in every respect in which the two differ less complicated, both as to outward and inward form.

Future observations must show whether amongst the different species of *Helicolimaces* (*Vitrinæ*) there are forms requiring separation; at present there seems no sufficient reason to doubt their general agreement.

I would remark that I have used the word *Helicolimax* throughout merely to keep up an uniformity with Mr. Lowe's paper, and to avoid the possibility of confusion. *Vitrina* appears by far the most preferable name, as it asserts nothing more than the glass-like appearance of the shells, whereas *Helicolimax* would lead us to suppose the shells exactly intermediate between the two genera of which the name is compounded, which is scarcely strictly true.

References to the Figures.

N. B. All are more or less magnified.

TAB. SUPP. XLVIII.

Fig. 1. Represents the mass of the mouth and intestines, the nervous cord having been removed from its situation, above the origin of the œsophagus. The stomach is in its state of contraction.

m. Mass of mouth.

n. n. Salivary ducts.

o. Œsophagus.

p. Cartilagineous cone of the tongue.

q. Retractor muscle of mass of the mouth.

r. Salivary glands, covering upper portion of the stomach.

s. Lower portion.

t. Rectum.

u. Anus.

Fig. 2. Part of the œsophagus, stomach and duodenum, from which the salivary glands have been removed; the upper portion of the stomach is in its extreme state of contraction.

o. Œsophagus.

v. Upper portion of stomach.

s. Lower portion.

Fig. 3. The same laid open to shew the intromusception of the upper portion. The letters have the same signification.

Fig. 4. The same view as Fig. 3, of a specimen in which the mass of the mouth was exerted, together with the ganglions of the nervous cord.

q. Œsophagus.

r. Lower portion of stomach.

u. Right cerebral ganglion.

v. Left ditto.

x. Great ganglion formed by confluence of two lateral ganglions.

z.z. Nerves of great tentacula.

Fig. 5. Tooth from upper part of the mouth.

Fig. 6. Organs of generation.

a. External pouch.

b. Penis.

c. Retractor muscle.

d. Muscular body, into which run the matrix and "vessie."

e. Vas deferens.

f. Vessie.

g. Tubes of ditto and matrix, of which that on the right belongs to the matrix.

**i.* Large lobe of testicle.

k. Oviduct.

l. Large lobe of liver containing the ovary.

**h.* Matrix.

Fig. 7. Upper part of the same as the last seen from behind. The letters have the same signification.

Fig. 8. The upper part laid open from the same side of Fig. 6, which is the upper side with respect to the animal.

a. Tube of penis prolonged within the external pouch.

β. Tube of vessie.

γ. Orifice to matrix.

The other letters as before.

ART. XLI. *On the Vitality of Toads enclosed in Stone and Wood. By the Rev. W. BUCKLAND, F.R.S., F.L.S., F.G.S, and Professor of Geology and Mineralogy in the University of Oxford.*

IN the month of November, 1825, I commenced the following experiments with a view to explain the frequent discoveries of Toads enclosed within blocks of stone and wood, in cavities that are said to have no communication with the external air.

In one large block of coarse oolitic limestone, (the Oxford oolite from the quarries of Heddington) twelve circular cells were prepared each about one foot deep and five inches in diameter, and having a groove or shoulder at its upper margin fitted to receive a circular plate of glass, and a circular slate to protect the glass; the margin of this double cover was closed round and rendered impenetrable to air and water by a luting of soft clay. Twelve smaller cells, each six inches deep and five inches in diameter, were made in another block of compact siliceous sandstone, viz. the Pennant Grit of the Coal formation near Bristol; these cells also were covered with similar plates of glass and slate cemented at the edge by clay. The object of the glass covers was to allow the animals to be inspected, without disturbing the clay so as to admit external air or insects into the cell. The Limestone is so porous that it is easily permeable by water, and probably also by air; the sandstone is very compact.

On the 26th of November, 1825, one live Toad was placed in each of the above mentioned twenty-four cells, and the double cover of glass and slate placed over each of them and cemented down by the luting of clay; the weight of each Toad in grains was ascertained and noted by Dr. Daubeny and Mr. Dillwyn at the time of their being placed in the cells; that of the smallest was 115 grains, and of the largest 1185 grains. The large and small animals were distributed in equal proportion between the limestone and the sandstone cells.

These blocks of stone were buried together in my garden beneath three feet of earth, and remained unopened until the 10th of December, 1826, on which day they were examined. Every Toad in the smaller cells of

the compact sandstone was dead, and the bodies of most of them so much decayed, that they must have been dead some months. The greater number of those in the larger cells of porous limestone were alive, No. 1, whose weight when immured was 924 grains now weighed only 698 grains. No. 5, whose weight when immured was 1185 grains, now weighed 1265 grains. The glass cover over this cell was slightly cracked so that minute insects might have entered ; none however were discovered in this cell ; but in another cell whose glass was broken, and the animal within it dead, there was a large assemblage of minute insects, and a similar assemblage also on the outside of the glass of a third cell. In the cell No. 9, a Toad which when put in weighed 988 grains, had increased to 1116 grains, and the glass cover over it was entire, but as the luting of the cell within which this Toad had increased in weight was not particularly examined, it is probable there was some aperture in it by which small insects found admission. No. 11 had decreased from 936 grains to 652 grains.

When they were first examined in December, 1826, not only were all the small Toads dead, but the larger ones appeared much emaciated, with the two exceptions above mentioned ; we have already stated that these probably owed their increased weight to the insects which had found access to the cells and become their food.

The death of every individual of every size in the smaller cells of compact sandstone appears to have resulted from a deficiency in the supply of air in consequence of the smallness of the cells, and the impermeable nature of the stone ; the larger volume of air originally enclosed in the cells of the limestone, and the porous nature of this stone itself (permeable as it is slowly by water and probably also by air) seems to have favored the duration of life to the animals enclosed in them without food.

It should be noticed that there is a defect in these experiments arising from the treatment of the twenty-four Toads before they were enclosed in the blocks of stone. They were shut up and buried on the 26th of November, but the greater number of them had been caught more than two months before that time, and had been imprisoned altogether in a cucumber frame placed on common garden earth, where the supply of food to so many individuals was probably scanty and their confinement

unnatural, so that they were in an unhealthy and somewhat meagre state at the time of their imprisonment. We can therefore scarcely argue with certainty from the death of all these individuals within two years, as to the duration of life which might have been maintained had they retired spontaneously and fallen into the torpor of their natural hybernization in good bodily condition.

The results of our experiments amount to this ; all the Toads both large and small inclosed in sandstone, and the small Toads in the limestone also, were dead at the end of thirteen months. Before the expiration of the second year, all the large ones also were dead ; these were examined several times during the second year through the glass covers of the cells, but without removing them to admit air ; they appeared always awake with their eyes open, and never in a state of torpor, their meagreness increasing at each interval in which they were examined until at length they were found dead ; those two also which had gained an accession of weight at the end of the first year and were then carefully closed up again were emaciated and dead before the expiration of the second year.

At the same time that these Toads were enclosed in stone, four other Toads of middling size were enclosed in three holes cut for this purpose on the North side of the trunk of an apple tree ; two being placed in the largest cell, and each of the others in a single cell ; the cells were nearly circular, about five inches deep and three inches in diameter ; they were carefully closed up with a plug of wood so as to exclude access of insects, and apparently were air-tight ; when examined at the end of a year, every one of the Toads was dead and their bodies were decayed.

From the fatal result of the experiments made in the small cells cut in the apple tree, and the block of compact sandstone, it seems to follow that Toads cannot live a year excluded totally from atmospheric air, and from the experiments in the larger cells within the block of oolitic limestone, it seems also probable that they cannot survive two years entirely excluded from food ; we may therefore conclude that there is a want of sufficiently minute and accurate observation in those so frequently recorded cases, where Toads are said to be found alive within blocks of stone and wood, in cavities that had no communication whatever with the external air. The fact of my two Toads having increased in weight at the end of a year, notwithstanding the care that was taken to enclose them perfectly

by a luting of clay, shews how very small an aperture will admit minute insects sufficient to maintain life. In the cell No. 5, where the glass was slightly cracked, the communication though small was obvious, but, in the cell No. 9, where the glass cover remained entire, and where it appears certain from the increased weight of the enclosed animal, that insects must have found admission, we have an example of these minute animals finding their way into a cell, to which great care had been taken to prevent any possibility of access.

Admitting then that Toads are occasionally found in cavities of wood and stone with which there is no communication sufficiently large to allow the ingress and egress of the animal enclosed in them, we may, I think, find a solution of such phenomena in the habits of these reptiles, and of the insects which form their food. The first effort of the young Toad, as soon as it has left its tad-pole state and emerged from the water, is to seek shelter in holes and crevices of rocks and trees. An individual, which, when young, may have thus entered a cavity by some very narrow aperture would find abundance of food by catching insects, which like itself seek shelter within such cavities, and may soon have increased so much in bulk as to render it impossible to go out again through the narrow aperture at which it entered. A small hole of this kind is very likely to be overlooked by common workmen who are the only people whose operations on stone and wood disclose cavities in the interior of such substances. In the case of Toads, Snakes and Lizards, that occasionally issue from stones that are broken in a quarry, or in sinking wells, and sometimes even from strata of coal at the bottom of a coal mine, the evidence is never perfect to shew that the reptiles were entirely enclosed in a solid rock; no examination is ever made until the reptile is first discovered by the breaking of the mass in which it was contained, and then it is too late to ascertain without carefully replacing every fragment (and in no case that I have seen reported has this ever been done) whether or not there was any hole or crevice by which the animal may have entered the cavity from which it was extracted. Without previous examination it is almost impossible to prove that there was no such communication. In the case of rocks near the surface of the earth, and in stone quarries, reptiles find ready admission to holes and fissures. We have a notorious example of this kind in the Lizard found

in a chalk pit and brought alive to the late Dr. Clarke. In the case also of wells and coal pits, a reptile that had fallen down the well or shaft and survived its fall would seek its natural retreat in the first hole or crevice it could find, and the miner dislodging it from this cavity to which his previous attention had not been called, might in ignorance conclude that the animal was coeval with the stone from which he had extracted it.

It remains only to consider the case, (of which I know not any authenticated example,) of Toads that have been said to be found in cavities within blocks of limestone to which on careful examination, no access whatever could be discovered, and where the animal was absolutely and entirely closed up with stone. Should any such case ever have existed, it is probable that the communication between this cavity and the external surface had been closed up by stalactitic incrustation after the animal had become too large to make its escape. A similar explanation may be offered of the much more probable case of a live Toad being entirely surrounded with solid wood. In each case the animal would have continued to increase in bulk so long as the smallest aperture remained by which air and insects could find admission; it would probably become torpid as soon as this aperture was entirely closed by the accumulation of stalactite or the growth of wood; but it still remains to be ascertained how long this state of torpor may continue under total exclusion from food, and from external air: and although the experiments above recorded shew that life did not extend two years in the case of any one of the individuals which formed the subjects of them, yet, for reasons which have been specified, they are not decisive to shew that a state of torpor, or suspended animation, may not be endured for a much longer time by Toads that are healthy and well fed up to the moment when they are finally cut off from food, and from all direct access of atmospheric air.

The common experiment of burying a Toad in a flower-pot covered with a tile, is of no value unless the cover be carefully luted to the pot, and the hole at the bottom of the pot also closed, so as to exclude all possible access of air, earthworms and insects. I have heard of two or three experiments of this kind, in which these precautions have not been taken, and in which at the end of a year the Toads have been found alive and well.

Besides the Toads enclosed in stone and wood, four others were placed

each in a small basin of plaster of Paris, four inches deep and five inches in diameter having a cover of the same material carefully luted round with clay; these were buried at the same time and in the same place with the blocks of stone, and on being examined at the same time with them in December, 1826, two of the Toads were dead, the other two alive but much emaciated. We can only collect from this experiment that a thin plate of plaster of Paris is permeable to air in a sufficient degree to maintain the life of a Toad for thirteen months.

In the 19th vol. No. 1, p. 167, of Silliman's American Journal of Science and Arts, David Thomas, Esq. has published some observations on Frogs and Toads in stone and solid earth, enumerating several authentic and well attested cases; these, however, amount to no more than a repetition of the facts so often stated and admitted to be true, viz. that torpid reptiles occur in cavities of stone, and at the depth of many feet in soil and earth, but, they state not anything to disprove the possibility of a small aperture by which these cavities may have had communication with the external surface, and insects have been admitted.

The attention of the discoverer is always directed more to the Toad, than to the minutæ of the state of the cavity in which it was contained.

In the Literary Gazette of March 12, 1831, p. 169, there is a very interesting account of the habits of a tame male Toad, that was domesticated and carefully observed during almost two years by Mr. F. C. Husenbeth. During two winters, from November to March, he ate no food, though he did not become torpid, but grew thin and moved much less than at other times. During the winter of 1828 he gradually lost his appetite and gradually recovered it. He was well fed during two summers, and after the end of the second winter, on the 29th of March, 1829, he was found dead. His death was apparently caused by an unusually long continuance of severe weather, which seemed to exhaust him before his natural appetite returned. He could not have died from starvation, for the day before his death he refused a lively fly.

Dr. Townson also, in his Tracts on Natural History, (London, 1799,) records a series of observations which he made on tame Frogs, and also on some Toads; these were directed chiefly to the very absorbent power of the skin of these reptiles, and show that they take in and reject liquids, through their skin alone, by a rapid process of absorption and evaporation,

a Frog absorbing sometimes in half an hour as much as half its own weight, and in a few hours the whole of its own weight of water, and nearly as rapidly giving it off when placed in any position that is warm and removed from moisture. Dr. T. contends that as the Frog tribe never drink water, this fluid must be supplied by means of absorption through the skin. Both Frogs and Toads have a large bladder, which is often found full of water: "whatever this fluid may be, (he says,) it is as pure as distilled water and equally tasteless; this I assert as well of that of the Toad which I have often tasted, as that of Frogs."

ART. XLII. *Descriptions of two species of Araneidæ, Natives of Madeira. In a Letter to the Editor, by the Rev. R. T. LOWE, B.A.*

TO THE EDITORS OF THE ZOOLOGICAL JOURNAL.

Gentlemen,

The accompanying drawings, with notes of the observations from which the following characters have been drawn up, were made partly in my presence, and came into my possession altogether on the death of Dr. Heineken. My separate investigations and enquiries having since gone far to satisfy me of the correctness of his views relating to the two *Araneidæ* which are the subject of this short notice, I feel myself called upon to make them public. But farther than having fully proved the fidelity of the drawings, and repeatedly confirmed by my own observations the correctness of his, I shall be entitled to little more merit than that of throwing Dr. Heineken's notes into a proper form and language for publication; while, on the other hand, should the following facts prove neither new nor interesting, I must take upon myself the blame for

not having made a better use of the time and opportunities, denied to my late friend, which his acuteness would not have failed to improve to the utmost.

I am, Gentlemen,

Your obedient Servant,

R. T. LOWE.

Funchal, Madeira,

Feb. 16th, 1831.

Class. ARACHNIDA.

Ord. PULMONARIA.

Fam. ARANEIDÆ.

Trib. INEQUITELÆ, Latr.

Gen. SCYTODES, Latr.

Scytodes velutina, Hein. et nob.

Scyt. velutina; tota sepiolina, immaculata: thorace magno, suborbiculato; posticè rotundato, elevato; anticè obsoletè sulcato; abdomine subgloboso. Longit. $2\frac{1}{2}$, lin.

Hab. in domibus Maderæ: *Scytode thoracica* ipsâ rarâ multò rarior.

Mare nondum capto, fœminam tantùm vidi. Prædæ (Lepismatibus, Tineis, fermè) more *Scyt. thoracica* telam jacit. Species à *Scyt. thoracica* omninò distinctissima.

Trib. LATERIGRADÆ, Latr.

Gen. LOXOSCELES, Hein. et nob.

Char. gen.

Oculi sex, æquales, per paria dispositi, parvi, segmentum circulare vel lunatum, arcu antico, (sc. anticè convexo), delineantes: lateralibus haud tuberculo impositis. *Maxillæ* labiumque ut in *Scytode (thoracica)*. *Mandibulæ* robustæ, ungue valido (ut in plerisque Araneidis). *Pedes* secundi, deinde primi et quarti æquales, longiores; tertii cæteris breviores.

OBS.—Thorax depressus. Citissimè currit. Quietus pedes omnes obliquè in libellâ horizontali extendit. Telam prædæ nec jacit, nec ullam nisi fila quædam struit. In prædam furtim obrepit, haud insiliens.

Affinitas cum *Philodromis*, Walck., summa; sed oculis tantùm sex,

sicut *Scytodes* ab affinibus suis, statim distinguitur. Genus à *Scytode* omninò distinctum. In *Scytode* verà (*Scyt. thoracica*, Latr., et *Scyt. velutina*, nob.), *thorax* elevatus: *oculi* triangulum delineant, lateralibus tuberculo impositis: *mandibularum unguis* minutissimus: tardigrada, telam prædæ jactit: quieta, pedibus elevatis insistit: pedes quarti, primi deinde, tum secundi longiores.

Species, *Loxosceles citigrada*, Hein. et nob.

TAB. SUPP. XLVIII. fig. 1, 2, 3, 4, 6, 7, 9, 11, 12 et 14.

Char. spec. idem ac generis.*

Hab. in domibus Maderæ; inter chartas, fossilia, aliaque Museorum, &c. degens. Rariss. v. v. et ♂ et ♀.

Explanation of the Plate.

TAB. SUPP. XLVIII.

- Fig. 1. ♀ *Loxosceles citigrada* at rest, in natural attitude.
 2. Ditto ditto, at rest, watching for prey.
 3. ♂ Ditto, taken when dead, to exhibit proportionate length of legs.
 4. One of the palpi of ditto, ditto; with the ♂ organ.
 5. Ditto of *Scytodes thoracica*, Latr., with ditto for comparison.
 6. Lip (*languette*, Latr.,) and maxillæ (*machoires*, Latr.,) of ♂ *Loxosceles citigrada*.
 7. Profile of head of ditto, ditto; (perhaps not quite correct as the legs were in the way.)
 8. Ditto of ditto of ♀ *Scytodes thoracica*, Latr.
 9. Eyes of ♂ *Lox. citigrada*; central pair geminated, and on a slight tubercle; lateral pairs subgeminated, and not on a tubercle: all with orbits.
 10. Ditto of ♂ *Scyt. thoracica*, Latr.; two lateral pairs on tubercles; central not: all geminated.
 11. One of the palpi of ♀ *Lox. citigrada*; will answer equally for *Scyt. thoracica*, Latr.

* The following are the proportions of a ♂ *Loxosceles citigrada* by accurate measurements.

Thorax $1\frac{1}{2}$ line; abdomen about 2 lines; second pair of legs $10\frac{1}{2}$ lines; first and fourth pair each 2 lines; third pair $7\frac{1}{2}$ lines.

12. Mandibles, (*Chelicères*, *antenne-pinces*, ou *serres frontales*, Latr.), of ♀ *Lox. citigrada*.
13. Ditto of ♀ *Scyt. thoracica*, Latr.
14. Outline profile of abdomen and thorax of *Lox. citigrada*.
15. Ditto ditto of *Scyt. thoracica*, Latr.

All except Figs. 1, 2 and 3, more or less magnified.

ART. XLIII. *Note on the Ash-coloured Harrier, (Falco cinerarius, Mont.)* By W. O. AIKIN, Esq., in a Letter to the Editor.

TO THE EDITOR OF THE ZOOLOGICAL JOURNAL.

Sir,

I have had, during the last month, an opportunity of examining several specimens of the ash-coloured Harrier, (*Falco cinerarius*,) and as the females differ materially from the description published in Selby's Illustrations of British Ornithology, perhaps my remarks may not be unacceptable to the readers of your valuable Journal.

In the description above alluded to, it is stated that "the whole of the under parts are orange-brown without *spot* or *streak*;" I have now seen five adult females, none of which have the under parts of a *uniform colour*, on the contrary, every feather for a considerable space on each side of the shaft is very much darker than the edges, so as to give the appearance of lengthened streaks down the breast, belly and thighs, but more particularly on the breast; the irides also of four of these birds were of a deep hazel, though certainly arrived at maturity, as one of them was brought to me with its mate and nest of young; the other had the irides of a very light yellow, and from its general appearance I should judge was a much older bird, as the whole plumage was of a lighter colour.

Montagu, in the Supplement to his Ornithological Dictionary, substitutes the description of a young male for that of the mature female, in which he states that the under parts are of a uniform colour, so that it is apparent

ornithologists should not adopt his description throughout. It however agrees exactly with two young ones which I have at present alive, excepting that the irides of mine are of a deep hazel; they are about two months old, and are kept in a garden with young ones, of about the same age, of both the other Harriers; these differ so materially from their companions that they could never be mistaken by a person who has once seen them; first, their size is so much less, then the deep rust colour which pervades their whole plumage and the absence of the ruff of small feathers round the head at once distinguish them from the common Hen-Harrier. I find them much wilder than the others, and the male when disturbed is continually uttering a short shrill call while the others are silent unless actually laid hold of. They all strike with their talons, not using their bills till their feet are secured.

I had an opportunity of weighing and measuring the birds in my own collection, the particulars of which are as follows:

A male killed 17th June, weighed $9\frac{3}{4}$ ounces troy. Length $17\frac{1}{2}$ inches.

Breadth $3\frac{1}{2}$ feet. In the crop were five Lizards in fragments, the tails only being perfect.

A female killed 17th June, weighed $10\frac{1}{2}$ ounces, troy. Length $18\frac{1}{2}$ inches.

Breadth 3 feet, $6\frac{1}{2}$ inches.

A female killed 19th June, weighed $9\frac{1}{4}$ ounces, troy. Length $17\frac{1}{2}$ inches.

Breadth 3 feet, 9 inches. Tail $9\frac{1}{2}$ inches. Three of the ova were as large as marbles, there were also a great many smaller ones.

A female killed 1st July, weighed $8\frac{1}{2}$ ounces, troy. Length 17 inches.

Breadth 3 feet, 9 inches. Tail 9 inches.

If these remarks are considered worthy your notice, and the young birds live, I shall be happy to furnish you with any other memoranda which I consider curious during their change of plumage.

I remain, Sir,

Your's, &c.

W. O. AIKIN.

Cambridge,

23rd July, 1830.

ART. XLIV. *Notice sur la Carinaria et description.* Par.
M. VERANY.

Corps cylindrique allongé, garni de points saillans, prolongé en arriere et garni à sa partie posterieure et inferieure d'une nageoire qui lui sert de gouvernail.

Une nageoire rougeâtre munie d'une ventouse est implantée perpendiculairement sur le dos; c'est à l'aide de celle-ci qu'elle vogue en tout sens. Tête qui se contracte dans le corps, munie d'une trompe retractile. Deux tentacules longs et coniques placés latéralement à l'insertion de la Tête; deux yeux en avant du corps placés à la base des tentacules. Bouche garnie d'une machoire se roulant sur elle meme, munie de quatre rangées de dents dont les deux internes fixes et petites, les intérieures de deux à deux crochues et mobiles.

Organes de la respiration, cœur, et anus suspendus sous le corps et renfermés dans une coquille.

Sexes séparés comme dans les Firoles; les males ont leur organe sexuel placé anterieurement dans le côté gauche sous la nageoire dorsale, les femelles l'ont près de l'anus.

Un tube rougeâtre renflé à son commencement est tout son appareil digestif. Dans sa cavité l'on rencontre entre les yeux un ganglion d'ou partent plusieurs nerfs, dont six se dirigent en avant et quatre en arriere; ceux qui vont en avant se dirigent deux vers la bouche et paraissent faire agir la trompe, deux aux tentacules, et aux yeux; de ceux de derrière deux vont directement dans le nucleus; les deux autres vont se reunir sous le nageoire d'ou ils se ramifient en cinq, dont trois dans la nageoire dorsale et deux vers la queue. Malgré toutes les attentions possibles je n'ai pu decouvrir à quoi ce mollusque utilise la ventouse qu'il a à sa nageoire.

La *Carinaria* se nourrit de corps gelatineux et de quelques très petits poissons tels que *Atherina nana*. J'ai plusieurs fois trouvé dans son estomac des restes d'autres Carinaires; ce qui me prouve que cette espèce se detruit mutuellement.

On la rencontre presque toute l'année sur nos côtes; assez abondante pendant les mois de mai, juin, juillet. Il est très rare de la trouver avec sa coquille entière. C'est *La Hóloturiorum secunda species*, Rondelet, p. 126. De Insectis, &c. Lib. 1. Nice.

ART. XLV. *Observations upon the Eighteenth Number of the Zoological Journal.* By J. O. WESTWOOD, Esq., F.L.S., &c.

TO THE EDITOR OF THE ZOOLOGICAL JOURNAL.

SIR,

My attention having been in an especial manner directed by Mr. MacLeay in the last number of this Journal, (p. 178), to the comparative structure of the *thorax* of the genera of Insects, I beg leave to assure you that so interesting and important a subject has not been overlooked in the course of my entomological investigations. There is, however, a remarkable opinion entertained by the French *Scavans* relative to the typical structure of the terminal portion of the *Metathorax* of the *Hymenoptera*, which, upon being informed that Mr. MacLeay was engaged upon that subject, I had hoped would have been subjected to his scrutinizing investigation; I cannot therefore but regret that he was not aware of the opinion referred to, otherwise he would doubtless have noticed it. I find the following observation in Latreille's *Familles Naturelles*, p. 259. "Le thorax des Hyménoptères à abdomen pediculé et celui des Diptères a une composition particulière, il est fermé postérieurement par le premier segment de l'abdomen, celui que j'ai nommé (Mém. du Mus. d'Hist. Nat. tom. 7.) mediaire, de sorte que des segments suivants, celui qui parait être le premier de cette partie du corps, est réellement le second." Such also is the opinion of M. Audouin, as he himself recently informed me in Paris; and indeed M. M. Cuvier, Lacépède, and Duméril in their Report, dated 19th February, 1821, upon that gentleman's Researches mention this, as "une observation curieuse de l'auteur" p. 11.

Why does not M. Audouin enlighten the students of comparative anatomy, by the publication of his very numerous delineations and descriptions relative to the structure of the *thorax* of the various orders?

The student should also direct his attention to the anatomical investigations of M. Srauss upon the Cock Chaffer and Hornet.

Intimately connected with the question of the typical formation of the *thorax* is that relative to the typical number of segments in the *Annulosa*. The examination of the Earwig is sufficient to convince any

one that the decapod theory entertained in the “*Horæ Entomologicæ*,” and that of the *thorax* being composed of five, and the *abdomen* of seven segments is unfounded, and indeed Mr. MacLeay himself in the last number of this Journal is induced to explode the idea. The *abdomen* of that insect is in fact composed of *nine* distinct segments, the last of which is furnished, in addition to the caudal pincers, with an exserted anal apparatus. The figure given by M. Léon Dufour in the “*Annales des Sciences Naturelles*” (April, 1828,) in his admirable researches upon these insects, with a view to their establishment as a distinct order, unfortunately represents the *abdomen* with only seven segments, the two basal ones being omitted, which might easily lead to a belief that this part of the body is in reality only seven jointed, the two basal joints being concealed beneath the wings.

With regard to the name of the Order comprising the Earwig, it may be observed that the term *Dermaptera* employed by Mr. Kirby, (who first on the suggestion of Dr. Leach established the Order), was proposed by Retzius the translator of De Geer for the *Orthoptera*. The former name addition to this in confusion, “*n’exprimant nullement les traits caractéristiques de ce nouvel ordre d’insectes, nous lui préférons,*” says Dufour, “*à juste titre celle de Labidoures,*” which Dumeril had long ago proposed as its *Family* name in allusion to the caudal pincers.

In order however to maintain the names of all the orders in the Linnean phrase derived from the wings, there exists no difficulty in selecting that of the very peculiar manner in the folding of these of the Earwig, from which circumstance the name *Euplekoptera** may not be thought inapplicable.

It is to be regretted that the opinions of M.M. Audouin and MacLeay are not unanimous respecting the legitimate analogy of the *Collar* of the *Hymenoptera*, although both agree as to its being a portion of the *prothorax*. Mr. Curtis indeed still continues to describe it as the *whole* of that organ.

Our lamented fellow labourer Dr. Heineken, in his pleasant manner (*Zoological Journal*, Vol. V. p. 103), has attempted to cast the shadow of a doubt over the correctness of my observations relative to the “*Loves of the Spiders*” detailed in a former number of this Journal; I have

* *Eu, bene πλέχω, plico πτερον, ala.*

328 Mr. Westwood's *further Remarks on Clinidium, &c.*

consequently been anxious to corroborate my remarks by a renewed examination of the same species of Spiders in their webs. I have not, however, been fortunate in again observing the act of impregnation; but at one time during the last autumn I perceived no less than six pairs engaged on separate webs in preparatory dalliance according to the Arachnidan method of courtship. This of itself (although not altogether confirmatory of my former observation) is strongly corroborative of its correctness; but as the pleasure resulting from the unlooked for confirmation of our observations when doubted, ranks next to that arising from novel discoveries, I was gratified in meeting with the interesting details given by M. Latreille of M. Walckenaer's observations relative to the "accouplement de *Theridon benignum*" (Encycl. Meth. Vol. 10, p. 624). I shall merely extract the following short passage as entirely removing all doubt upon the most material fact advanced in my paper, which, however, the Reviewer in the "Bulletin des Sciences Naturelles" has entirely overlooked. "Ils restent accouplés pendant deux ou trois minutes et quelque fois plus long temps."

In page 218 I have observed that the geographical situation of *Rhysodes* and *Clinidium* appeared distinct; such is not, however, the case. I have observed in the cabinet of the Baron Dejean six or eight species of the former genus, several of which were collected in Brazil by M. La Cordaire. Vide Annales des Sciences Naturelles.

The doubtful situation of *Cucujus* and *Spondylis* is shewn by Dumeril in his "Considerations Generales" having placed them between the *Bostrichidæ* and *Trogositidæ*, as "genres anomaux de Tetramères."

Consult Mr. MacLeay's *Horæ Entomologicæ*, p. 1. Appendix t. on the supposed affinity of *Trogosita* with the *Lucanidæ*.

I find that in my remarks upon *Megagnathus*, I had overlooked Sturm's figure of the underside of the head. It is however far from being in his happy style.

The propriety of the generic separation of *Trogosita cærulea*, *ænea*, &c. under the name of *Temnoscheila* is fully confirmed by the observations of M. La Cordaire, in his account of the habits of Brazilian Beetles, (Annales des Sciences Naturelles.) The economy being distinct from the true *Trogositæ*.

The Rev. F. W. Hope has recently received some splendid species of my genus *Temnoscheila*.

Since my observations upon the relationship between *Lucanidæ* and *Prionidæ*, and the additional note C. were written, I have examined two most interesting insects which tend more forcibly to convince me of their propriety.

The first, (intended to be described in the next volume of the Transactions of the Cambridge Philosophical Society,* is the most magnificent of Lucanidous insects, and in the lateral spines of its *thorax*, and the whorl of hairs ornamenting the tip of the extremely long basal joint of the *antennæ*, an approach is made to the *Capricornes*.

The second,† belonging to J. G. Children, Esq., and the most splendid of Prionideous Insects, is remarkable for the length of its *palpi* which instead of being short and blunt, like those of the *Prionidæ* generally, are as long as those of a *Lucanus*; the last joint of the maxillary *palpi* is however flattened at the tip, which is obliquely rounded and papillose.

I have also had an opportunity of more minutely examining a ♀ specimen of the insect mentioned in note C. p. 237,‡ also belonging to J. G. Children, Esq. Its *trophi* resemble those of some of the female *Lucanidæ*, such as *Pholidotus*, *Ryssonotus*, &c. as well those of *Parandra*, Zoological Journal, Tab. Supp. 47, fig. 7 A. The eyes are reniform as in the *Prionidæ*, instead of being divided into four distinct eyes, two above and two beneath, as in *Lucanus*. The *Tarsi* are not exactly cylindric, being slightly compressed and the under surface very finely cushioned or rather clothed with fine short bristles. Between the claws there is a very small coriaceous appendage, but without the additional minute pair of claws of the *Lucanidæ*.

* Under the name of *Chiasognathus Grantii*, Steph., MSS.

† *Psalidognathus Friendii*, G. R. Gray.

‡ *Trictenotoma Childreni*, G. R. Gray.

330 Mr. Broderip's *Description of Cypræa Scottii*.

ART. XLVI. *Description of a new Cowry and other Testacea, brought to England by the Rev. Archdeacon Scott.*
By W. J. BRODERIP, Esq., F.R.S., F.L.S., &c. V.P.G.S.

CYPRÆA SCOTTII.*

C. testâ ovato-oblongâ, subpyriformi, gibbâ, pallidè ferrugineâ maculis atro-ferrugineis, subtus planulatâ, fusco-nigricante, intus albidâ; aperturæ albens latere sinistro ut plurimum edentulo, anticè crenato.

Mus. Geol. Soc.

Habitat in freto Sundæ juxta Angiam Javæ.

Obs. testa junior albida fusco longitudinaliter strigata, strigis transversim subinterruptis.

Long. poll. $3\frac{3}{8}$. Lat. $1\frac{6}{8}$.

Shell ovate-oblong, inclining to pear-shaped, gibbous, pale ferruginous with blackish spots, rather flattened beneath, where it is of a rich dark brown or purple-black. The interior is white and so is the aperture, the right side of which is closely but not very deeply toothed, while the left is toothless for the greatest part of its length, shewing only a few denticles or crenations at its anterior extremity. The posterior notch is wide, deep, and reflected, and the lips of its edges are very prominent.

The Rev. Archdeacon Scott, whose name this species bears, found two individuals on the shore near Angia in the Island of Java, and liberally presented them, together with the rest of his collection to the Geological Society of London. The backs of these shells are so much eroded by the action of the atmosphere and of sea-water that only traces of the colour remain; but the under part is in a fair state of preservation and the smooth margin of the left side of the aperture is very distinct in both. They are adults, and one of them is apparently of advanced age; and, notwithstanding their blemished state, the characters still remaining are sufficient to mark specific difference.

Just as this description was going to press, Mr. Turner brought me another of these shells in better condition than those belonging to the Geological Society, and confirming the characters above given; but the outer or enamelled surface is rubbed through, and the interior layer of

* *Cypræa Friendii*, Gray, Zool. Miscell. named and published by that author after he knew that the shell was here named, described, figured, and ready for publication.—*Ed.*

colouring is brought into view, shewing the appearance which the shell would present in its youth, and before the secretion of the last coat which marks the adult state.

It is hoped that the figures and description here given, may, as the locality is known, be the means of drawing the attention of those who may have it in their power to procure finer specimens. When a dead shell is found on a beach, an accurate search at low water under stones, rolled madrepores, &c. or in pools left by the retiring tide is often rewarded with the discovery of the living mollusc; and if success should not attend such efforts, the dredge will be rarely found to fail.

TROCHUS AUSTRALIS.

T. testâ conicâ, granulato-annulatâ, annulis suturam supereminentibus maximis, luteâ vel subalbidâ maculis subrubris et violaceis pictâ; anfractibus planiusculis; infimâ facie planiusculâ, imperforatâ; fauce argenteâ. Habitat ad Novæ Hollandiæ oras occidentales, ad Insulam Buâche.

Long. poll. 1. Lat. $\frac{7}{8}$.

Mus. Geol. Soc.

This elegant *Trochus* which approaches in shape to *T. conulus*, while in a part of its colouring it reminds the observer of *T. annulatus*, and has somewhat the aspect of *T. Zizyphinus*, was found on the beach of Garden Island, (Isle Buâche) by Archdeacon Scott, and was presented by him to the Geological Society.

TURBO LAMELLOSUS.

T. testâ orbiculato-depressâ, profundè umbilicatâ, transversim creberrimè lamellatâ, griseâ, subtus albidâ; anfractibus carinatis et suturam versus profundè canaliculatis; fauce argenteâ.

Habitat ad Novæ Hollandiæ oras occidentales, ad Insulam Buâche.

Mus. Geol. Soc. nost., &c.

This shell varies much in its different stages of growth. It approaches nearest to *Turbo torquatus*, but differs from that species in the depth and sharpness of its lamellæ, and the flattened form of the whorls which are carinated on their outward edge and deeply and angularly channelled towards the suture. The young shells are much more flat than those of advanced growth, they are dashed with darkish stripes along the upper side of the whorl which terminate at the edge of the carina, and are mottled with the same colour on the under side. Archdeacon Scott found his specimens on the beach of Garden Island, (Isle Buâche;) and on the main land

opposite, at the bottom of a well eighty feet deep he found in calcareous grit two fossil Turbines figured at plate SUPP. XLIX, fig. 1, 1, which appear to me to be identical with *Turbo torquatus*. The latter species did not occur among the shells in a recent state which the Archdeacon found at Garden Island; but we know that it occurs at Port Jackson on the opposite side of New Holland, and Lamarck gives New Zealand as its locality, so that I think it probable that it may be found also in the vicinity of Garden Island.

Description of Plates.

PLATE XIV.

Fig. 1, 2. *Cypræa Scottii*.

3. The same deprived of the last coat of enamel, and giving the appearance of the back of a young shell. The back of the specimen is fractured.

PLATE SUPP. XLIX.

Fig. 1, 1. Fossil *Turbo torquatus*,

2, 2. *Turbo lamellosus*, (young,) the lip imperfect.

3. *Trochus Australis*.

VOLUTA.

I take this opportunity of stating that a comparison of a great number of individuals which have lately been brought to this country, has afforded satisfactory proof that *Voluta Pacifica* and *Voluta elongata* are identical: *Voluta elongata*, (Swainson,) being only a smooth variety of *V. Pacifica* at an advanced age.

ART. XLVII. *Description of the Cirrhipeda, Conchifera and Mollusca, in a collection formed by the Officers of H.M.S. Adventure and Beagle employed between the years 1826 and 1830 in surveying the Southern Coasts of South America, including the Straits of Magalhaens and the Coast of Tierra del Fuego. By Captain PHILLIP P. KING, R.N., F.R.S., &c. assisted by W. J. BRODERIP, Esq., F.R.S., &c.*

The testacea, of which the following paper is a descriptive list, were principally collected upon the Coast of South America; and upon my arrival in England, were submitted to the examination of Mr. George Sowerby; who, very obligingly, selected the undescribed species from

the collection, which had been formed under my superintendence by the Officers of H.M.S. Adventure and Beagle, employed under my command in surveying the Southern Coast of South America.

To these gentlemen I am greatly indebted for the unwearied assiduity which they at all times displayed, and for the extent of the collection in this, as well as in other departments of Natural History.

In the description of the species I have had the benefit of the advice and assistance of my friend Mr. Broderip; and to his knowledge of the subject, and the attention which he has devoted to my collection, I owe in a great measure the paper which I have now the satisfaction of presenting to the public through the medium of the Zoological Journal.

Upon examining my specimens Mr. George Sowerby found that he possessed several species not in my collection. These had been obtained during the voyage, and had been purchased from some of the crew by Mr. Sowerby, who handsomely put his acquisitions into my hands for description. I record this act of good feeling towards myself and the officers of the expedition in general with the greater satisfaction, *because the same liberality has not been evinced in another quarter*. I have been compelled to notice the conduct last alluded to, because, by possibility, some of the novelties collected during the voyage may be published before this communication (which has been delayed by the many laborious duties consequent on such an expedition) issues from the press.

1. BALANUS PSITTACUS.

Syn. *Lepas Psittacus*. Molina, 1., 223.

B. testâ albido-rosaceâ, subconicâ, elongatâ, rudi, longitudinaliter creberrimè striatâ; radiis transversim striatis; operculo transversim profundè sulcato, lineis elevatis creberrimè plicatis; valvis posticis valdè productis, acuminatis.

Habitat ad oras Concepcionis et insulam Chiloe. *Mus. Brit., nost., Broderip, &c.*

This cirrhiped which, at Concepcion de Chile, is frequently found of a larger size than $5\frac{1}{2}$ inches long and $3\frac{1}{2}$ in diameter, forms a very common and highly esteemed food of the Natives, by whom it is called *Pico*, from the acuminated processes of the two posterior opercular valves. The anterior and posterior opercular valves when in contact, present some resemblance to a Parrot's beak, whence Molina's name. It is also found very abundantly at Valdivia and

at Calbuco, near the north end of the Island of Chiloe. It occurs in large bunches, and presents somewhat of a cactus-like appearance. The parent is covered by its progeny, so that large branches are found composed of from 50 to 100 distinct individuals, each of which becomes in its turn the foundation of another colony. One specimen in the possession of my friend W. J. Broderip, Esq., consists of a numerous group based on two large individuals. They are collected by being chopped off with a hatchet. At Concepcion, where they are found of larger size than to the southward, they are principally procured at the Island of Quiriquina, which lies across the entrance of the bay; whence they are exported in large quantities to Valparaiso and Santiago de Chile, where they are considered as a great delicacy, and indeed with some justice, for the flesh equals in richness and delicacy that of the crab, which, when boiled and eaten cold, it very much resembles.

2. ELMINIUS LEACHII.*

E. testâ albidâ, truncatâ, longitudinaliter striatâ, radiis creberrimè longitudinaliter substriatis; operculo ad basin transversim striato, quadripartito; long. $\frac{5}{8}$; lat. $\frac{3}{8}$; poll.

Habitat. . In Museo Geo. Sowerby et nost.

3. SCALPELIUM PAPILLOSUM.

S. pedunculo creberrimè papilloso; testâ lævi valdè compressâ; long. omnino $\frac{1}{16}$; $\frac{4}{16}$ pedunculi; lat. $\frac{1}{16}$, poll.

Habitat in mare alto circa oras Patagonicas. *Mus. nost., G. Sowerby.*

Taken by a dredge in 40 fathom water, off the coast of South America, in latitude $44\frac{1}{2}$ south, and found adhering to a Terebella.

4. PHOLAS CHILOENSIS. MOLINA.

P. testâ elongatâ posticè ovato-rotundatâ, costis posticis dentato-muricatis; anticè attenuatâ striis transversis posticè undato-muricatis, anticè muticis; lat. 5; long. 2; poll.

Habitat ad insulam Chiloei. *Mus. Brit., nost., Brod., Stokes.*

Some doubt has been thrown upon the existence of this shell notwithstanding the description of Molina. A species very nearly approaching

* *Elminius Kingii*, Gray in Zool. Miscell. from a specimen collected during the voyage.—Ed.

it, if not identical, was found at Rio de Janeiro, but as only single valves were obtained, and these were in a very imperfect state, I have not ventured to characterise it.

The soft parts of *Pholas Chilensis* are considered very delicate by the inhabitants of the Island of Chiloe, by whom the animal is called "Co-mes." They are found in great abundance at low water imbedded in the rocks near Sandy Point, at San Carlos de Chiloe.

5. SOLEN SCALPRUM.

S. testá lineari subrectá extremitatibus subrotundatis; cardine bidentato; long. $1\frac{3}{8}$; lat. $3\frac{1}{8}$; poll.

Habitat ad Patagoniæ oras Orientales (Sea Bear Bay.) *Mus. nost.*

6. ANATINA ELLIPTICA.

A. testá ellipticá, subtenui, transversim striatá, anticè sub-truncatá, epidermide fuscá, tenui; long. $1\frac{3}{8}$; lat. $2\frac{3}{8}$; poll.

Habitat ad oras Antarcticæ (New South Shetland.) *Mus. Brit., nost.*

This shell was found at New South Shetland, by Lieutenant Kendall, of His Majesty's Sloop, Chanticleer, by whom it was presented to me.

7. MACTRA EDULIS.

M. testá subtrigoná, tumidá, sublævi, fulvo-squalidá, intus albá, dentibus lateralibus prominentibus; long. 2; lat. $2\frac{1}{2}$; poll.

Habitat in freto Magellanico (Port Famine.) *Mus. Brit., nost., Brod.*

This shell was found in great abundance on the flat of sandy mud, which fronts the west shore of Port Famine, and proved a valuable article of food to the ship's company, particularly during the winter months, when sea-birds and game were not to be procured, and the fish had deserted us. I have named it, in allusion to its affording us a grateful, as well as seasonable, supply of fresh food.

8. ERYCINA SOLENOIDES.

E. testá subellipticá, transversim creberrimè substriatá, albidá, epidermide fusco-griseá; long. 1 paulo minus; lat. 2; poll.

Habitat in freto Magellanico (sandy mud flats of Port Famine.) *Mus. Brit., nost., Brod.*

9. TELLINIDES ROSACEA.

T. testá subtrigóná, planulatá, striis concentricis creberrimis; long. $\frac{6}{8}$; lat. $1\frac{5}{6}$; poll.

Habitat ad littora Brasilæ (Santos.) *Mus. nost.*

10. VENUS INFLATA.

V. testá rotundatá, concentricè substriatá, albente, intus albá, lunulá obsoletá; long. $1\frac{9}{16}$; lat. $1\frac{5}{8}$; poll.

Habitat in freto Magellanico (Port Famine.) *Mus. nost.*

11. VENUS ANTIQUA.

V. testá sub-ovali, convexiusculá, creberrimè cancellatá, sub-fuscá, intus albidá; lunulá cordatá; long. $2\frac{5}{8}$; lat. 3; poll.

OBS. in junioribus, striis transversis concentricis elevatis, acutis.

Habitat ad littora occidentalia Patagoniæ (Gulf of Peñas and its vicinity.) *Mus. Brit., nost., Brod.*

12. ARCA ANGULATA.

A. testá transversá, subcordato-quadratá, intus fusco-violascente; latere antico producto, elevato, undulatim lamellato, postico rotundato; umbonibus valdè remotis, aréâ cardinali maximá, striatá; margine hianté; long. $1\frac{1}{8}$; lat. $1\frac{7}{8}$; poll.

Habitat ad Juan Fernandez. *Mus. nost.*

This shell was dredged up from 80 fathoms water in the offing of Cumberland Bay, at Juan Fernandez; it was attached to a branch of coral.

The hinge is broad and smooth, with distinct markings; the gape is rather wide, and the anterior part of the shell rises rather elegantly, like the stern of some Indian canoes, and in all the specimens but one, terminates in a point. The one above described has a rounded form; the bows or front being rather elegantly and finely lamellated in a wavy form; the colour of the hinge is red, and the inside is generally of a brownish purple; in some it has a more yellow tinge.

13. ARCA PECTINOIDES.

A. testá auriculatá, cordatá, ventricosá, multi-costatá, transversim striatá, albá, epidermide rufo nigricante, pilosá; umbonibus sub-

approximatis, incurvatis, margine crenulato; long. 1; lat. $1\frac{3}{8}$; poll.

Habitat ad Rio de Janeiro. *Mus. Brit., nost., Brod.*

14. *NUCULA STRIATA.*

N. testâ striatâ, subtumidâ, crassâ, sub-trigonâ, albâ; latere antico productioni, sub-rostrato; long. $\frac{2}{3}$; lat. $\frac{3}{8}$; poll.

Habitat in mari alto circa oras Patagonicas. *Mus. nost.*

Taken by a dredge in 40 fathoms water, 20 miles from the coast of South America, in the neighbourhood of Port St. Elena.

15. *MODIOLA SINUOSA.*

M. testâ ventricosâ. subovatâ, longitudinaliter striatâ; intus iridescente, margine sinuoso; epidermide fuscâ; long. $\frac{7}{16}$; lat. $1\frac{1}{8}$ fere; poll.

Habitat ad littora Brasilie (Santos.) *Mus. nost.*

16. *PECTEN PATAGONICUS.*

P. testâ sub-æquivalvi, brunneâ, longitudinaliter creberrimè elevato-radiatâ; intus albidâ, longitudinaliter sub-radiatâ; long. $2\frac{1}{8}$; lat. $2\frac{1}{8}$; poll.

OBS. auribus inæqualibus.

Habitat in freto Magellanico passim. *Mus. nost.*

17. *PECTEN VITREUS.*

P. testâ subæquivalvi, translucente, longitudinaliter multi-sulcatâ; sulcis convexis flavidulis, valvâ inferiore pallidiori; long. $1\frac{9}{16}$; lat. $1\frac{3}{8}$; poll.

OBS. Auribus inæqualibus.

Habitat in freto Magellanico (passim.) *Mus. nost.*

This shell is found attached to the leaves of the *Fucus giganteus*, and, with other *Mollusca*, is the food of the Steamer or Race-horse Duck (*Micropterus brachyptera* and *M. Patagonica*.)

18. *TEREBRATULA FLEXUOSA.*

T. testâ rotundato-cordatâ, gibbâ, sub-fuscâ, longitudinaliter creberrimè

sulcatâ; margine valdè flexuoso; long. $1\frac{3}{8}$; lat. $1\frac{4}{8}$ paulo minus; poll.

Habitat in freto Magellanico (Port Famine.) *Mus. Brit., nost., Brod.*

This shell, which was dredged up from deep water in the Bay of Port Famine, attached to stones, is not a common shell in the Strait.

19. TEREBRATULA SOWERBII.

T. testâ subrotundâ, planiusculâ, subfuscâ, longitudinaliter radiatim transversim substriatâ, medio supernè depressâ, infra convexâ, subglabrâ; margine utrinque crenulato, medio glabro; long. $1\frac{7}{8}$; lat. $1\frac{7}{8}$ paulo plus; alt. $\frac{1}{8}$; poll.

Habitat in freto Magellanico. *Mus. nost., Geo. Sowerby.*

20. CHITON SETIGER.

C. testâ ovali, anticè subattenuatâ; valvis subdentatis, tenuiter concentricè striatis, anticâ 10-radiatâ, posticâ lævi, parvulâ; areis lateralibus striis duabus elevatis marginalibus; ligamento marginali lævigato, setigero; long. $2\frac{3}{8}$; lat. $1\frac{3}{8}$; poll.

Habitat ad oras insulæ Tierra del Fuego et in freto Magellanico. *Mus. Brit., nost., Brod.*

Shell ovate, rather attenuated towards the anterior end, generally of a light blue-green colour, variegated with markings of dark slate. Valves slightly beaked with minute concentric striæ, the lateral compartments with two marginal ridges, which in some specimens are granulose, in others smooth. The anterior valve has eight, besides two marginal, ridges of the same character; the posterior valve is very small and smooth. Border coriaceous, and set with bristles produced from three rows of tufts or pores. In some of the specimens in my possession the bristles are rubbed off.

The shell is found in all parts of the shores of Tierra del Fuego, particularly on its seaward coast, and the western parts of the Strait of Magalhaens.

21. CHITON BOWENII.

C. testâ oblongo-ovatâ, castaneo-rufâ; dorso elevato; valvis subdentatis, sublævibus concentricè tenuiter striatis; areis lateralibus radiatim sulcatis; ligamento marginali granuloso, nigro; long. $3\frac{3}{8}$; lat. $1\frac{1}{2}$; poll.

Habitat ad oras insulæ Tierra del Fuego et in freto Magellanico. *Mus. Brit., nost., Brod.*

Shell oblong-ovate, and generally of a chestnut red, and the granu-lose ligament black ; the colour of the younger specimens is more bril-liant, and sometimes interspersed with yellow. Middle valves slightly toothed, and very delicately lineated, the lines forming an obtuse angle in the direction of the axis of the shell ; the lateral compartments are marked with deeper striæ or grooves, radiating from the upper angle to the base, which, crossing the transverse markings of the valve, have a reticulated appearance : the anterior and posterior valves are radiated with fine lines.

This Chiton was discovered by Mr. Bowen, Surgeon of the Beagle, by whom it was presented to me. The specimen was sent home among a collection of Natural History, transmitted in the year 1827.

22. FISSURELLA COARCTATA.

F. testâ ovatâ, anticé attenuatâ, elevatâ ; radiis frequentibus elevatis ; internè virescenti ; foraminis margine externo juxta medium coarc-tato, subdentato ; long. $2\frac{5}{16}$; lat. $1\frac{1}{16}$; alt. $\frac{1}{16}$; poll.

Habitat ad Portum Praya. *Mus. Brit., nost.*

23. HELIX TRANSLUCENS.

H. testâ subglobosâ, translucente, levissimè transversim striatâ ; anfractu basali lineâ longitudinali castaneâ sub-mediâ ornato ; long. $\frac{1}{2}$; lat. $\frac{9}{16}$; poll.

Habitat ad Rio de Janeiro. *Mus. Brit., nost., Brod.*

24. HELIX PUSIO.

H. testâ rotundo-complanatâ, creberrimè striatâ, translucente, maculis castaneo-rufis ornatâ ; long. $\frac{1}{16}$; lat. $\frac{3}{16}$; poll.

Habitat ad Juan Fernandez. *Mus. Brit., nost., Brod.*

25. HELICINA SORDIDA.

H. testâ globoso-conoideâ ; anfractibus rotundatis longitudinaliter stri-atâ ; operculo castaneo ; long. $\frac{2}{3}$ paulo plus ; lat. $\frac{5}{16}$ paulo plus ; poll.

Habitat ad Rio de Janeiro. *Mus. Brit., nost.*

The colour of this shell is of a dirty yellowish white, with a slight tinge of diaphanous violet within the margin of the lip.

26. PUPA SUBDIAPHANA.

P. testá cylindracedá, albá, subdiaphaná, transversim creberrimè substriatá; long. $\frac{4}{8}$ paulo minus; lat. $\frac{3}{16}$ paulo minus; poll.

Habitat ad Portum Praya. (Cape de Verd Islands.) *Mus. Brit., nost.*

27. BULINUS GRAVESII.

B. testá subventricosá, longitudinaliter subrugosá, sub-albíá, fusco-maculatá, spirá longitudinaliter striatá; long. $1\frac{4}{8}$; lat. $\frac{1}{16}$ paulo minus; poll.

Habitat ad Valparaiso. *Mus. nost.*

I have named the shell after my shipmate and friend, Lieutenant Thomas Graves, whose zeal assiduity in assisting and increasing my collections of Natural History, was as unwearied as the alacrity and ability which he displayed in the primary and more important objects of the voyage, of which in His Majesty's Ship, Adventure, he filled the appointment of Assistant Surveyor. To Lieutenant Graves I am principally indebted for my land-shells, and I therefore take the opportunity of recording the valuable assistance he rendered me during the whole period of his serving under my command.

28. BULINUS GRAVESII, var.

B. testá subpyramidali, scabrá, albídá, aliquando lineolis raris; epidermide lutescente; long. $1\frac{9}{16}$; lat. $\frac{1}{16}$ paulo plus, poll.

Habitat ad Valparaiso. *Mus. Brit., nost., Brod.*

This is certainly a variety of No. 27, Bulinus Gravesii.

29. BULINUS DENTATUS.

B. testá cylindracedá, punctatá, sub-diaphaná, fusco maculatá; aperturá dentatá, clausilium mentiente; long. $1\frac{5}{8}$; lat. $\frac{5}{16}$; poll.

Habitat ad oras Brasilíæ (St. Catherine's.) *Mus. Brit., nost.*

30. BULINUS LUTESCENS.

B. testá obovatá, ventricosá, subscabrá, lutescente; long. $1\frac{1}{8}$; lat. $\frac{1}{16}$; poll.

Habitat ad Maldonado (Gorriti.) *Mus. Brit., nost., Brod.*

31. *BULINUS CORRUGATUS.*

B. testá subalbidá, transversim et longitudinaliter rugoso-striatá, maculis fuscis, obsoletis; aperturá purpurascente; columellá nigricante purpureá; long. $1\frac{6}{8}$ paulo plus; lat. $\frac{1}{16}$; poll.

Habitat ad Concepcion. *Mus. Brit., nost., Brod.*

The body-whorl of the older specimens of this shell is rather roughly striated or wrinkled, the last but one slightly so, and the remaining whorls are quite smooth. The colour is whitish, with purple spots more or less obsolete: the old specimens are sometimes of a dull yellowish white. A specimen is deposited in the British Museum.

The young shells of this species are of a whitish brown, with darker coloured striæ. They are very fragile and semi-transparent.

32. *BULINUS SORDIDUS.*

B. testá pyramidalí, transversim striatá, fuscá; anfractu basali ad suturam subalbido, lined subcentricá pallidá; labii vix reflexi marginé albo; long. $1\frac{1}{16}$; lat. $\frac{7}{8}$ poll.

Habitat ad Brasiliam (Rio de Janeiro.) *Mus. nost.*

33. *BULINUS MULTICOLOR.**

B. testá ovato-pyramidalí, longitudinaliter et transversim creberrimè substriatá, luteo-fuscá maculis albis et purpureo-atris fucatá; labio roseo subreflexo; columellá subalbidá, aperturá intus subatro-purpureá; long. $1\frac{5}{16}$; lat. $\frac{9}{16}$; poll.

Habitat ad Brasiliam. *Mus. nost., Geo. Sowerby.*

33.* *BULINUS ROSACEUS.*

B. testá ovato-oblongá, scabriusculá; apice et anfractibus primis, rosa-

* Whilst this sheet was printing, the September number of the *Annales des Sciences* made its appearance in England, containing a description of the above shell by M. Sander Rang accompanied by an excellent figure (*Annales des Sciences Naturelles*, September, 1831, p. 55, pl. 3, f. 1.) It is there named *Helix multicolor*. In my description I have considered it to be a *Bulinus*, but its specific name has been altered to that given to it by M. Rang.

ceis, cæteris viridi-fuscis; labro albo; suturis crenulatis seu plicatis; long. $2\frac{1}{8}$; lat. 1; poll.

Habitat ad oras Americæ meridionalis, (Chile.) *Mus. Brit., nost., Brod., Geo. Sowerby, &c.*

Soon after the return of the expedition, my friend, Mr. Broderip, to whose inspection Lieutenant Graves had submitted his collection, observing symptoms of life in some of the shells of this species, took means for reviving the inhabitants from their dormant state, and succeeded. After they had protruded their bodies, they were placed upon some green leaves, which they fastened upon and ate greedily. These animals had been in this state for seventeen or eighteen months, and five months subsequently another was found alive in my collection, so that this last had been nearly two years dormant. These shells were all sent to Mr. Loddiges's nursery, where they lived for eight months, when they unfortunately all died within a few days of each other. Soon after the shells were first deposited at Mr. Loddiges's, one got away and escaped detection for several months, until it was at last discovered in a state of hybernation; it was removed to the place where the others were kept, when it died also. The upper surface of the animal when in health is variegated with ruddy spots and streaks on an ash coloured ground.

34. PARTULA FLAVESCENS.

P. testâ subfusiformi, pallide flavâ, interdum castaneâ vel flavo et castaneo variâ; long. $\frac{1}{16}$; lat. $\frac{5}{16}$ paulo plus; poll.

Habitat ad oras Americæ meridionalis, (Valparaiso.) *Mus. Brit., nost., Brod.*

This shell varies in its colour almost as much as *Bulinus citrinus*.

35. ACHATINA DONELLII.

A. testâ subalbida, transversim substriatâ, anfractu basali ventricosâ; long. $\frac{7}{16}$ paulo plus; lat. $\frac{2}{8}$; poll.

Habitat ad Lima. *Must. nost.*

36. ACHATINA DIAPHANA.

A. testâ subcylindraceâ, diaphanâ, transversim striatâ; long. $\frac{5}{16}$; lat. $\frac{5}{16}$; poll.

Habitat ad insulam Juan Fernandez, in montibus. *Mus. Brit., nost., Brod.*

37. ACHATINA STRIGATA.

A. testâ diaphanâ, subalbidâ, creberrimè transversim substriatâ, strigis longitudinalibus castaneis raris; anfractu basali subangulato; long. $\frac{1}{6}$ paulo plus; lat. $\frac{6}{16}$ paulo minus; poll.

Habitat in paludibus Brasiliæ, (Santo Paulo.) Mus. nost.

38. ACHATINA SORDIDA.

A. testâ subdiaphanâ, subconicâ, anfractu basali ventricosâ; long. $\frac{6}{8}$ paulo plus; lat. $\frac{3}{8}$ paulo plus; poll.

Habitat ad Brasiliam, (Rio de Janeiro.) Mus. nost.

39. ACHATINA SELLOVII.

A. testâ cylindraceâ transversim striatâ subdiaphanâ; long. $\frac{5}{16}$; lat. $\frac{2}{16}$; poll.

Habitat ad Brasiliam, (St. Catherine.) Mus. Brit., nost., Brod.

This shell, which I found at the city of Nossa Sen^a. de Estero, I have dedicated to my friend, Dr. Sellow, whose researches in Natural History for several years past in the interior of Brazil, are well known to the scientific world.

40. SUCCINEA FRAGILIS.

S. testâ ovato-acutâ, diaphanâ, ventricosâ, transversim striatâ, obliquè subrugosâ; spirâ brevî; long. $\frac{9}{16}$ paulo minus; lat. $\frac{6}{16}$; poll.

Habitat ad insulam Juan Fernandez. Mus. Brit., nost., Brod.

41. SUCCINEA PATULA.

S. testâ diaphanâ, ovato-rotundatâ, ventricosissimâ, transversim creberrimè striatâ; spirâ brevissimâ; aperturâ patulâ; long. $\frac{4}{8}$ paulo plus; lat. $\frac{3}{8}$ paulo plus; poll.

Habitat ad insulam Juan Fernandez.

MARINULA. Nov. Genus.

Character Genericus.

Testa ovato-producta, sub-solidâ; apertura ovata, integra; columella bidentata, et basin versus uniplicata; dentibus magnis sub-remotis conniventibus, superiore maximo; operculum nullum.

42. MARINULA PEPITA.

M. testâ ovato-productâ, viridi-fuscâ ; anfractibus sub-tumidis ; spirâ brevi ; aperturâ nigricante ; dentibus plicâque albidis ; long. $\frac{7}{16}$; lat. $\frac{4}{16}$; poll.

Habitat ad insulam Chiloe. *Mus. Brit., nost., Brod., G. Sowerby.*

This animal, which I have thought it necessary to assign to a new genus, appears to have for its nearest neighbours the genera *Auricula* and *Pedipes*. It was found on the wooden piles which support the mole in the Bay of San Carlos, in Chiloe, below the wash of the high water. The mole stands out into the sea, and there is no fresh water near it, save a very little rill which discharges its tiny stream more than fifty yards off.

43. LYMNÆA DIAPHANA.

L. testâ turritâ, transversim substriatâ, anfractibus ventricosus ; long $\frac{1}{16}$, paulo plus ; lat. $\frac{5}{16}$; poll.

Habitat ad fretum Magellanicum, (Cape Gregory.) *Mus. Brit., nost., Brod.*

This shell was found in the fresh-water ponds in the neighbourhood of Cape Gregory, which is on the continental side of the eastern end of the Strait of Magalhaens.

44. AMPULLARIA CUMINGII.

A. testâ globosâ, transversim striatâ, subalbidâ, longitudinaliter castaneo-lineatâ et fasciatâ, epidermide virescente ; umbilico parvo ; lat. $1\frac{7}{16}$; long $1\frac{6}{16}$; poll.

Habitat in Sinu Panamæ, (Island of Saboga, in a small hill-stream.) *Mus. Brit., nost., Brod.*

From Mr. Cuming's collection. I have named this shell after Mr. Cuming, from whom I received it.

45. NATICA GLOBOSA.

N. testâ globosâ, tenui, ventricosissimâ, corned vel subalbidâ, subtilissimè striatâ ; spirâ brevi ; umbilico parvo ; operculo valdè tenui ; long. $\frac{1}{6}$ paulo plus ; lat. $\frac{7}{8}$; poll.

Habitat ad fretum Magellanicum, (Cape Gregory.) *Mus. Brit., nost., Brod.*

46. NATICA CASTANEA.

N. testá ovato-acutá, castaneá, albo-lineatá; aperturá mediocri; columellá valdè callosá; umbilico mediocri; long. $\frac{1\frac{3}{6}}$; lat. $\frac{2\frac{1}{2}}$; poll. Habitat ad Brasilæ oras, circa Santos. Mus. nost.

47. TURBO LUGUBRIS.

T. testá nigricante, striatá; aperturá argenteá; labri margine nigrá, subcrenulatá; operculo valdè lapidoso, albo; long. $2\frac{1}{8}$; lat. $2\frac{2}{8}$ fere; poll.

Habitat ad Sinum Peñas. Mus. Brit., nost., Brod.

48. ODONTIS SUBPLICATA.

O. testá granuloso-striatá, viridi-fuscá, nigro maculatá; umbilico mediocri; labri margine sub-plicato; long. $\frac{1\frac{6}{6}}$; lat. $\frac{1\frac{3}{6}}$ paulo plus; poll.

Habitat ad Brasiliam (Rio de Janeiro.) Mus. Brit., nost.

49. LITTORINA FLAVA.

L. testá longitudinaliter striatá, sub-flavá; spirá brevi; anfractu basali ventricosó; columellæ purpurascéntis margine et aperturá sub-flavá; operculo nigricante; long. $\frac{5}{8}$ paulo plus; lat. $\frac{7}{6}$; poll.

Habitat ad Brasiliam, (Rio de Janeiro.) Mus. Brit., nost.

In young shells there are a few obscure reddish brown streaks crossing the striæ.

50. LITTORINA PERDIX.

L. testá striis elevatis balteatá, albidá, fusco-maculatá, striis interstitialibus minus elevatis, ambabus sub-cancellatis; aperturá albá, labri margine tenui, castaneo-maculatá; long. $\frac{1\frac{3}{6}}$; lat. $\frac{1\frac{7}{2}}$; poll.

Habitat? Mus. nost.

51. LITTORINA STRIATA.

L. testá ovato-conicá, fuscá, striis elevatis scabrá; spirá brevi; anfractu basali tumido; aperturá nigricante, basin versus strigá luteo-albá ornatá; labri margine crenulato albo-fulvido; operculo nigro; long. $\frac{4}{8}$ paulo plus; lat. $\frac{7}{6}$ fere; poll.

Habitat in Mari Atlantico boreali, (Port Praya.) Mus. Brit., nost.

52. MARGARITA FASCIATA, n. s.

M. testâ albidâ, creberrimè striatâ, purpureo fasciatâ, aperturâ argentâ; long. $\frac{4}{16}$; *lat.* $\frac{5}{16}$ *fere*; *poll.*

Habitat in Mari Pacifico. *Mus. nost.*

Portions of the striated surface are elevated into belts, which are of a purple colour.

53. MARGARITA VIOLACEA.

M. testâ sub-ovatâ, violaceâ, spirâ brevi; anfractibus tumidis; aperturâ iridescente; long. $\frac{7}{16}$; *lat.* $\frac{8}{16}$ *fere*; *poll.*

Habitat ad fretum Magellanicum. *Mus. Brit., nost., Brod.*

Of this shell the Indians make their necklaces; it is found adhering to the leaves of the *Fucus giganteus*, and is the principal food of the Racehorse Duck (*Micropterus Patachonicus*, nob. in Proceedings of the Zoological Society, December 14, 1830, page 15.)

54. MARGARITA CÆRULESCENS.

M. testâ sub-complanatâ, cæruleâ, striatâ, albido-lineatâ, aperturâ iridescente; lat. $\frac{3}{16}$ *fere*; *long.* $\frac{1}{16}$; *poll.*

Habitat ad fretum Magellanicum, (Cape Gregory.) *Mus. Brit., nost., Brod.*

55. TURRITELLA TRICARINATA.

T. testâ turritâ, anfractibus tricarinatis; carinis nodulosis; long. $1\frac{5}{8}$; *lat.* $\frac{9}{16}$ *paulo minus*; *poll.*

Habitat ad oras Americæ meridionalis (Valparaiso.) *Mus. Brit., nost., Brod.*

The *Carinæ* are nodulous, or twisted like the strands of a rope; the twists of the upper *carina* are in the direction of a water-laid, or right-handed rope, and those of the two lower *carinæ* are in the opposite direction, or like what is termed a hawser-laid rope. Between these nodulous *carinæ* are elevated lines, and the base is very strongly striated. Found in deep water in the Bay of Valparaiso. Dead shells of this species are occasionally found thrown upon the beach, near the Almendral.

56. TURRITELLA NODULOSA.

T. testá elongato-turritá ; anfractibus striatis ; striis duabus maximis subnodulosis ; long. $1\frac{1}{6}$; lat. $\frac{7}{6}$ fere ; poll.

Habitat? Mus. Brit., nost.

The two large striæ, which are remarkable for the nodules, are not far from the middle of each whorl, and generally are nearer the upper suture : of these the lowest is the largest.

57. MUREX SALEBROSUS.

M. testá elongato-ovatá, subalbidá, fasciis fuscis, epidermide cinerá ; spirá brevi ; anfractibus angulatis, nodulosis ; aperturá oblongá ad basin angustá, castanéá, intus albá ; labro internè denticulato, dentibus obtusis albis ; columellá rectá, lævi ; canali brevi ; long. $3\frac{7}{8}$; lat. 2 ; poll.

Habitat? Mus. nost., Geo. Sowerby.

This species approaches *Murex vitulinus* very nearly, the body-whorl is very much elongated, and the nodules which mark the angles of the whorl are formed of the more elevated parts of what may be termed coarse longitudinal plaits.

58. MUREX RHODOCHEILUS.

M. testá ventricosá, albá, fasciis elevatis striatis ; septemfariam varicosá, varicibus roseis denticulatis ; aperturá rotundatá, roséá, intus albidá ; labri margine asperrimè denticulato ; caudá mediocri, sub-recurvá ; long. $3\frac{3}{8}$; lat. $2\frac{7}{8}$; poll.

Habitat? Mus. nost.

59. TRITON RANELIFORMIS.

T. testá ovato-fusiformi, subdepressá, albidá fusco fasciatá, costatá ; costis granulosis, interstitiis striatis ; aperturá subrotundá, albidá ; columellá subrugosá ; labro internè obtusè denticulato ; margine undulato ; epidermide viridi-fusca, scabrá ; long. $3\frac{3}{8}$; lat. $1\frac{6}{8}$; poll.

Habitat ad Sinum Peñas et oram occidentalem Americæ meridionalis.

Mus. Brit., nost., Brod.

The denticles of the outer lip are ranged in pairs at regular and somewhat distant intervals.

60. TRITON SCABER.

T. testâ ovato-acutâ, cancellatâ; spirâ elongatâ; epidermide fuscâ, setosâ; aperturâ albâ granulosâ; labro interne obtusè denticulato; long. ; lat. ; poll.

Habitat ad oras Americæ meridionalis, (Valparaiso.) *Mus. nost.*

The denticles of the inner lip are more elevated than those of the last (*T. ranelliformis*), and are equidistant. It was fished up with the anchor in Valparaiso Bay.

61. MONOCEROS FUSOIDES.

M. testâ ventricosâ, spirâ mediocri, anfractibus bicarinatis; anfractu basali lineis elevatis admodum distantibus cincto; aperturâ patulâ; dente labiali brevi, lato, obtuso; canali producto, recto, integro; operculo corneo; long. $2\frac{3}{4}$; lat. $1\frac{5}{8}$; poll.

Habitat ad oras Americæ meridionalis, (Concepcion.) *Mus. Brit., nost., Brod.*

Approaching *Fusus* in its elongated and entire canal, while its exterior lip has the labial tooth which distinguishes *Monoceros*. The columella is not straight, as in all the other species, but curved, so as to make an angle in some specimens at the commencement of the canal, and in all it becomes very broad at the point where it is opposite to the tooth. The shell is of a reddish colour, ventricose, and girt with elevated lines, about a quarter of an inch apart. The spire has only two of these lines on each whorl, and has a bicarinated appearance. The aperture is wide, the outer lip sinuous, its tooth short, broad, and obtuse, and the operculum horny. The shell is seldom found in a perfect state, the beak being generally broken off, and the surface is, in all the specimens that I have seen, covered with a calcareous encrustation, entirely concealing the colours.

62. BUCCINUM MURICIFORME.

B. testâ ovato-fusiformi, cinereâ; anfractibus tumidis, costellatis, costellis cancellatis; aperturâ castaneo-nigricante; labri margine crenulato. Muricem mentiens; long. 1; lat. $\frac{9}{16}$; poll.

Habitat ad fretum Magellanicum. *Mus. Brit., nost., Brod.*

The eggs of this species were found, and are preserved in spirits.

63. BUCCINUM SQUALIDUM.

B. testá conico-fusiforimi, fuscá; anfractu basali ventricoso; spirá mediocri; aperturá fuscá, lutescenti, patulá; long. $1\frac{1}{6}$; lat. $1\frac{1}{6}$; poll.

Habitat? Mus. Brit., nost., Brod.

64. BUCCINUM DEFORME.

B. testá ovatá, subponderosá, subalbidá, fasciis duabus fuscis obscuris; spirá brevi; anfractu basali subdepresso, suturam versus crasso; columellá valdè callosá; long. $1\frac{9}{10}$; lat. 1 paulo plus; poll.

Habitat ad flumen Plata, (Gorriti) Mus. Brit., nost.

The eggs of this shell contained in a transparent orbicular nidus, the size of a turtle's egg, were found thrown up on the sea-beach of the Island. In the month of January they were observed in all stages of growth. A series were preserved in spirits, and presented to the College of Surgeons.

65. COLUMBELLA MITRIFORMIS.

C. testá fusiformi, luteo-rufescente, fasciis nigro-castaneis, maculis albis tessellatá; long. $\frac{7}{16}$; lat. $\frac{3}{16}$; poll.

Habitat? Mus. Brit., nost., Brod.

66. MITRA PUSILLA.

M. testá ovato-acutá, ventricosá, fulvá, creberrimè costatá; costis interstitiisque striatis, basi granulósá; spirá brevi, anfractibus suturam supereminentibus; columellá quinque-plicatá; long. $\frac{5}{8}$; lat. $\frac{5}{16}$ paulo plus; poll.

Habitat? Mus. nost.

The denticles of the outer lip are arranged in pairs at regular, and somewhat distant, intervals.

67. VOLUTA.

A fragment of a turbinated shell, bearing marks more assignable to Voluta than to any other genus, was found on the sea beach in the neighbourhood of Cape Fairweather on the east coast of Patagonia, in latitude $51\frac{1}{2}^{\circ}$ south. The remains appear to differ from *Voluta Ancilla* and *Brasiliana*.

ART. XLVIII. *The characters of two new Dipterous Genera, with Indications of some generic subdivisions and several undescribed species of Dolichopulæ. By A. H. HALIDAY, Esq.*

Fam. TIPULIDÆ.

Sub Fam. CULICIFORMES, Meig.

Sectio **. Proboscis antennis brevior, palpi incurvati. (Meig.)

ORPHNEPHILA.

Oculi fronte confluentes : Ocelli 0.

Antennæ brevissimæ setacæ basi globosæ, utriusque sexus nudæ.

Tarsi antici elongati.

Alæ incumbentes parallelæ.

Caput subglobosum, oculis reniformibus fronte confluentibus : Ocelli 0. Antennæ capite breviores 11-articulatæ : articulus basalis papilliformis subimmersus; 2^{dus} maximus globosus; 3^{tus} 4^{tus} et 5^{tus} arcte connati quasi unicum magnum ovatum efficientes; reliqui cylindrici tenues, e quibus 6^{tus} brevis subovatus, et 9^{us} paulo brevior quam cæteri. Hypostoma parvum. Os haustello minimo incumbente, labellis magnis: palpi curvati antennis parum breviores 5-articulati: articulo primo parvo clavato; 2^{do} et 3^{io} majoribus compressis; 5^{to} brevior. Alæ areolis 2 disci internis, viz. intermedia et brachiali anteriore: nervura transversa 2^{dæ} et 3^{tiam} postcostales connectens ultra areolarum apicem est sita: nervuræ radiantes ex iisdem simplices: margo costalis alæ haud strictus at inæqualiter sinuatus. Coxæ inter se approximatae nec elongatae. Pedes graciles, tibiis ecalcaratis: Tarsi articulo basali longissimo, 4^{to} brevissimo emarginato, unguibus simplicibus; antici elongati metatarso tibiam superante. Abdomen brevius cylindricum 8-annulatum; segmento anali magno, in mare ventricosum. (TAB. XV, fig. 2—9.) De metamorphosi nil constat.

1. *devia*. TAB. XV, fig. 1.

Long. corp. 2 lin.—Exp. alar. $4\frac{1}{2}$ vel minor.

Caput nigro-fuscum, antennis et oculis nigris, ore fusco-pallido: Thorax rufo-castaneus subnitidus; halteres pallidi: Abdomen antice nigro fuscum,

segmento anali rufo-castaneo : Coxæ et pedes luteo-pallidi, tarsis apice fuscis : Alæ dilute cinereæ nervuris fuscis.

¶ Under the shady banks of rivulets in Holywood, also in the county Galway, October.]

Obs. This genus seems to come near *Macropeza* (which I suppose to have also naked antennæ in both sexes); and again to have some relations with *Ceratopogon*.

Fam. DOLICHOPIDÆ.*

RHAPHIUM. Meig. IV, 32, CXXIV.

1. *macrocerum*. Meig. IV, 29. 3.

¶ Both sexes near Holywood in Downshire.]

2. *caliginosum*. Meig. IV, 29. 4.?

¶ The male ibid.]

MACHÆRIUM.

Antennæ porrectæ articulo 3^{to} subtus exciso supra apice valde elongato lineari, stylo terminali breviorē biarticulato

Oculi disjuncti.

Alæ parallelæ incumbentes.

Frons lata, feminae latior. Antennæ basi approximatae, apice divaricatae, capite longiores; stylo terminali brevi, articulo 1^{mo} minuto ovato, 2^{do} setaceo. Os crassum prominens: Haustellum carnosum labro membranaceo lanceolato utrinque setula suffulto: Mandibulae sub labro extricatae eoque breviores cultratae disjunctae: Maxillae lobo lato trigono acuminato mandibulis breviorē haustelli basin utrinque amplectuntur: Lingua cornea rigida subuliformis: Labella pinguis discreta. (TAB. XV, fig. 11, 12.) Truncus subcylindricus. Alæ parallelæ incumbentes nervurâ 4^{tâ} longitudinali simplici. Pedes mediocres coxis haud insigniter longatis. Abdomen sub-cylindricum mediocre apice conicum, maris gracilius subtus oblique

* I have noticed every species in my cabinet, for the purposes of a local list and to introduce some generic subdivisions.

truncatum, Hypopygio minuto abscondito, stylis 2 minimis subulatis vix emergentibus.

1. *Maritimæ*. *M. aureo-virens*, antennis nigris, hypostomate niveo, pedibus ferrugineis: (*Mas*) tarsis anterioribus elongatis onychiis productis.

Exp. alarum ♂ . lin. 5+ : ♀ . 5½+.

Long. corp. ♂ . 2¼ . ♀ . 2½.

Antennæ nigræ: Os nigro-fuscum: Hypostoma et palpi niveo-sericantes: Facies sub antennis glaucescens: Genæ splendide-virides barba candida: Frons aurato-viridis: Oculi rufo-castanei: Thorax læte virens lineis 2 dorsi cupreis, aliis obsoletioribus subcaneis: Metathorax, pleuræ et coxæ glauco sericantes: Abdomen præsertim in femina magis auratum nigro setosum lateribus glauco pubescens: Halteres lutei: Alæ subhyalinæ radice et alulis dilute ferrugineis nervuris fusco-ferrugineis: Pedes pallide ferruginei nigro-pilosi et setosi, tarsis anticis apice posticis totis et tibiæ vix summo apice nigris: Tarsi anteriores maris onychiis insignibus ut in *Diaphoro*.

¶ ♂ ♀ Taken on the coast near Holywood, in July, 1828.]

DIAPHORUS. Meig. IV, 32, CXXIV.

1. *flavocinctus*. Meig. IV, 33, 1.

¶ Near Bexley, June.]

PSILOPUS. Meig. IV, 35, CXXV.

1. *platypterus*. Meig. IV, 36, 2.

Fabr. Syst. Antl. 270, 20.

[The wings of the male in repose are divaricate; it is fond of resting in small troops on the shady side of a gate or paling.]

CHRYBOTUS. Meig. IV, 40, CXXVI.

1. *læsus*. Meig. IV, 43, 7.
2. *nigripes*. ————— 6.
3. *femoralis*. ————— 5.

4. *neglectus*. — 41, 1.

5. *copiosus*. — 2.

¶ All these occur about Holywood.]

PORPHYROPS. Meig. IV, 45, CXXVII.

A. *Antennis apice setigeris*, (Mas) *articulo tertio valde elongato setâ brevissimâ*, *Metatarso postico basi subtus uncinato*. *Plectropus, mihi*.

1. *pallipes*. Meig. IV, 55, 23.

Fabr. Syst. Antl. 266, 2.

Varietatem feminæ segmento tertio immaculato qualem et ipse vidi *Meigen* pro genuina habuit.

¶ A common and diffused species.]

var. β . obscure viridi-æneus pedibus ferrugineis, femoribus tibiisque posticis apice nigris, abdomine basi maculis lateralibus flavis, alis obscuris.

I have several males of this variety from the west of Ireland, and none of var. α . from the same locality. They may probably be distinct species.

2. *pumilus*. Meig. IV, 53, 17.

¶ A single female near Holywood.]

3. *decoratus*. P. obscure viridi-æneus, pedibus ferrugineis, femoribus tibiisque posticis apice tarsisque nigris, alis cinereis.

Long. corp. $1\frac{2}{3}$.

Frons chalybea nitida : Facies sub antennis cyanea : Hypostoma candidum : Coxæ anticæ pedesque ferruginei, femora anteriora nonnunquam fusco-lineata. Femina major colore obscuriore, pedibus lutescentibus obsoletius infuscatis, a *Rhaphio macrocero* ♀ vix nisi antennarum formâ distinguenda.

¶ Not rare near Holywood in moist meadows among plantations.]

B. *Antennis apice setigeris*, (Mas) *Hypostomate angustissimo lineari*. *Perithinus, mihi*.

4. *riparius*. Meig. IV, 54, 18.

Feminam Meigen descripsit loco laudato.

Mas. Tarsorum anticorum articulo 2^do arcuato, 3^{io} et 4^{to} brevissimis. Antennarum articulo 3^{io} longiore quam feminæ. Frons obscure

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viridis: Hypostoma et barba candidæ: Femora nigra anteriora genubus fuscis, postica basi angustius pallida: Tibiæ fusco-ferrugineæ, posticæ apice fuscæ: Tarsi anteriores basi ferruginei: Femora antica dense nigro villosa.

Lamellæ sinuatæ exsertæ, quæ forma Meigenio audit "*filis analibus ♂ furcatis.*"

¶ Not uncommon on the sea-coast at Holywood: I have females also from Richmond Park.]

*Add. Labrum lanceolatum, mandibulis sub eodem brevioribus extricatis: Lingua subuliformis longior: Maxillæ lobo minimo trigono intra basin palporum vix detegendo.

†In omni specie ex hac familia adesse videntur mandibulæ discretæ plerumque cultratae, sed in pluribus (ex. gr. Generibus *Dolichopo*, *Medetero*, &c.) invicem adpressæ ideoque auctoribus errore acceptæ. Maxillæ stipes linearis rigidus haustelli lateribus est adnatus et lobus vix nisi in Genere *Machærio* conspicuus.

5. *insulsus*. P. obscure viridi-æneus, hypostomate aterrimo, antennis pedibusque nigris, tibiis ferrugineis, posticis compressis basi pallide flavis apice clavatis atris. (*Mas.*)

Long. corp. $2\frac{1}{2}$.

Color obscurior quam in præcedente: Abdomen brevius et pedes postici longiores: Frons fere nigra: Hypostoma et barba atræ: Femora omnia atra, postica latiora, coxæ anticæ nigro-villosæ: Tarsi antichi maris simplices apice nigri: Tibiæ posticæ longiores sinuato-compressæ: Lamellæ haud exsertæ.

¶ A single male taken on the coast near Holywood.]

6. *rufipes*. Meig. IV, 52, 14.

¶ Several females *ibid.*]

7. *obscuratus*. Meig. IV, 55, 21.

¶ A single female *ibid.*]

C. *Antennarum setâ dorsali ante apicem articuli tertii insertâ.*
Porphyrops.

8. *diaphanus*. Meig. IV, 46, 1.

Fabr. Syst. Antl. 270, 18.

¶ Taken near Holywood, but rare.]

9. *fulgens*. P. argenteo micans, thorace viridi-aureo, abdominis

basi fasciis interruptis flavo-diaphanis, hypostomate nigro.
(*Mas.*)

Long. corp. 2 vel 3 lin.

Antennarum articulus 3^{tus} brevior quam in præcedente: Frons argenteo-micans; Hypostoma et barba nigræ: Thorax viridi-aureus argenteo-micans: Abdomen argenteum nec ut in præcedente nigro-pilosum, segmentum 1^{um} basi viride, 2^{dum} 3^{tum} et plerumque 4^{tum} flavo-diaphana linea dorsali et incisuris nigris argenteo micantibus: Coxæ et femora nigro-fusæ anteriora apice pallida: Tibiæ pallide ferrugineæ, posticæ apice nigræ: Tarsi postici toti, antichi apice, concolores.

Differt a *P. diaphano* etiam alarum nervo 4^{to} vix leniter sinuato, pedibus gracilioribus et filis analibus vix emergentibus.

Confer *P. argyrcum*, Meig. IV, 46, 2, hypostomate (atque ut credo etiam barbâ) argenteo; etiam *Muscam semiargenteam*, Donovan et Turton, pedibus ferrugineis.

¶ Ibid.]

10. *versicolor*. Meig. IV, 50, 9.

¶ The female, ibid. very rare.]

11. *leucocephalus*. Meig. IV, 42, 8.

Segmentum 2^{dum} maculâ laterali flavo-pellucidâ obsoletiore.

¶ The female ibid.]

12. *vestitus*. Meig. IV, 48, 5.

¶ Two males ibid.]

D. *Antennarum setâ dorsali nudâ prope basin articuli tertii insertâ*.
(Bina Genera?)

13. *annulipes*. Meig. IV, 56, 25.

¶ Common on the coast at Holywood.]

14. *flavicoxa*. Meig. IV, 57, 27.

¶ Near Holywood in moist meadows.]

15. *flaviventris*. Meig. IV, 58, 28.

¶ Ibid.]

MEDETERUS. Meig. IV, 59, CXXVIII.

A. *Femoribus anticis obclavatis subtus spinulosis, coxis elongatis*
Antennarum setâ mediocri vel brevi.

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1. *regius*. Meig. IV, 60, 1.

Fabr. Syst. Antl. 267, 5.

¶ I have seen one female taken on the coast near Belfast, and now in the cabinet of Mr. G. C. Hyndman.]

2. *viridis*. Meig. IV, 60, 2.

¶ One male taken in Holywood.]

3. *notatus*. Meig. IV, 62, 6.

Fabr. Syst. Antl. 269, 10.

¶ I have met with this species from June to September, in Cheshire, Cumberland, and about Holywood.]

4. *formosus*. M. fusco-æneus, hypostomate aureo, pedibus viridibus geniculis testaceis; antennis tarsisque nigris. (*Femina.*)

Long. corp. vix 3. Exp. alar. $6\frac{1}{2}$.

Hypostoma fuscum aureo versicolor: Palpi nigri: Barba candido-sericea: Thorax fusco-æneus dorso magis virescens, lineis setigeris splendide cupreis: Abdomen viridi-subaureum ad latera tessellato-pubescentia formâ tereti fere ut in *M. regio*: Halteres pallide ferruginei: Alæ hyalinæ radice dilute ferruginæ nervurâ transversâ sinuatâ et 4^{tâ} longitudinali determinate flexuosâ: Pedes nitidi virides tarsis nigris femoribus auratis summo apice et tibiæ basi pallide testaceis.

¶ One female taken in Cheshire, September, 1828.]

5. *bipunctatus*. Meig. IV, 63, 7.

¶ One female on the coast near Holywood, March, 1829.]

6. *conspersus*. M. fusco-æneus, hypostomate aureo, femoribus rubineis, alis antice punctis postice lituris fuscis. (*Mas.*)

Long. corp. $1\frac{2}{3}$.

Frons et vertex atrii cupreo variantes: Thorax fusco-æneus lineis 2 nigricantibus, postice ad latera rubineo splendens: Abdomen longiusculum fusco-cupreum splendore rubineo obductum: Pectus, latera abdominis, postscutellum et coxæ schistaceo-sericatæ: Femora rubinea: Tibiæ æneo-virides: Tarsi nigri: Alæ obscure hyalinæ punctis fusco-ferrugineis serie duplici prope costam plerumque gemellatim dispositis et præterea nebulis dilutius fuscis versus marginem posticum: Nervura 4^{ta} subsinuata puncto solitario distinctiore: Hypopygium absconditum.

¶ A single male on the coast, Holywood, July 1828.)

OBS. Sub *M. nebuloso*, Meig. IV, 9, character specificus augendus

verbis "*hypostomate albido*."

7. *Balticus*. Meig. IV, 66, 12.

¶ On the sea coast, Holywood, March.—August.]

Var. β. alis hyalinis immaculatis.

[Much rarer than the other variety but does not seem to be specifically distinct.]

8. *præcox*. Meig. IV, 64, 8.

[I find this species on the sea-coast so early as March: on fine days about Midsummer a little before high-tide they may be seen in swarms resting lightly on the surface of the waves, and carried on by their advance: numbers of them will be found paired in this situation. I have met with the species also on the banks of the Thames, but always within the range of the tide.]

B. *Femoribus muticis, metatarso postico brevi, Hypopygio maris occulto, Antennarum setâ dorsali longiore. Camptosceles mihi.*

9. *Scambus*. Meig. IV, 68, 18.

Fall. Dol. 19, 26.

Alæ ut in sequente subfuscæ vel nigricantes nec hyalinæ. Maris femora intermedia crassiora subtus ante apicem nigro fasciculata: Tibiæ nigrae pilosæ, sinuato-compressæ et valde dilatatae: Metatarsus brevissimus articulo 2^{do} elongato sinuato: Femora postica subnuda.

¶ Sea coast and shady groves, Holywood, and in the county Galway.]

10. *curvipes*. Meig. IV, 65, 10.

Fall. Dol. 20, 27.

Maris femora intermedia incrassata subtus angulata densius setosa: Tibiæ ferrugineæ et medium usque crassiores apice sinuato nigro: Metatarsus brevissimus articulo 2^{do} longissimo lineari: Femora postica pilosa.

¶ With the preceding, but more abundant.]

11. *loripes*: M. olivaceus, alis fuscis, pedibus ferrugineis. (*Mas*) tibiis intermediis flexuosis nigris, metatarso brevior.

Long. corp. vix 1.

Maris femora intermedia obclavata subtus serie ciliorum medio interruptâ: Tibiæ nigrae vel totæ vel basi ferrugineæ vix subtilissime pubescentes, setulis rarioribus erectis, medio constrictæ: Metatarsus brevis

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vix crassior; articulo 2^{do} vix 3^{tium} æquante: Femora postica subnuda. Sequenti simillimus.

¶ Sea coast, Holywood, March, 1831.]

12. *Prodromus*. Meig. IV, 64, 9.

(*Mas.*) tibiis intermediis arcuatis intus pectinato-setosis.

Long. corp. vix 1 lin.

Alarum color quam in *M. Scambo* et *curvipede* fere dilutior: Maris femora intermedia obclavata subtus setoso-ciliata: Tibiæ ferrugineæ arcuatæ setulis longioribus rigidis: Metatarsus basi subtus angulatus, haud abbreviatus ut in antecedentibus: Femora postica subnuda.

¶ Most abundant on the sea-coast at Holywood, appearing a little earlier than *M. curvipipes*.

C. *Femoribus muticis, metatarso postico brevior prominu- lo, Hypopygio inflexo, Thorace ante scutellum deplanato. Tæchobates, mihi.*

13. *Jaculus*. Meig. IV, 66, 14.?

Fall. Dol. 5, 7.

¶ I captured one specimen (of this species as I think) in a sand pit at Erith, but have not preserved it.]

14. *nigricans*. Meig. IV, 67, 16.

[I have specimens from Greenwich Park, apparently of this species, but so ill preserved that I am not confident.]

15. *Truncorum*. Meig. IV, 67, 15.

¶ Common in sunny gravel pits, Holywood, and in the county Galway.

D. *Femoribus muticis, pedibus gracilibus elongatis, metatarso postico longiore. Leptopus, mihi.*

16. *tenellus*. Meig. IV, 69, 21.

¶ In moist meadows, Holywood.]

17. *ornatus*. M. ochraceus, thorace supra et abdominis vittâ dorsali viridi micantibus.

Long. corp. 1 $\frac{2}{3}$.

¶ Taken in Darent Wood.]

DOLICHOPUS. Meig. IV, 74, CXXX.

* *Lamellis adpressis, filis elongatis arcuatis clavatis apice cirrhosis.*
Hypophyllus, *mihi*.

1. *obscurellus*. Fall. Dol. 13, 11.

¶ Both sexes taken under the shady banks of rivulets at Holywood, but rare.]

** *Lamellis concavis hiantibus*. Genuini.

A. *Ciliis genarum nigris, Alarum nervo 4^{to} flexuoso.*

2. *ungulatus*. D. viridi-æneus, pedibus rufis, coxis tarsisque nigris, hypostomate candido, antennis atris.

Meig. IV, 80, 13.

Linn. Fauna. 1858.

(*Mas.*) femoribus posticis nigro-villosis.

Long. corp. 3.

¶ Generally diffused and abundant.]

3. *brevipennis*. D. obscure æneo-viridis, antennis basi subtus coxis anticis pedibusque rufis, tarsis apice posticis totis nigris. (*Mas.*) tarsis anticis elongatis articulis 2 ultimis atris compressis, 4^{to} brevi, 5^{to} latissimo, femoribus posticis pallido-villosis.

Meig. IV, 89, 27.

Long. corp. 3.

Alæ fere ut in *D. unguato*. Hypostoma flavo aureum.

¶ Both sexes on the sea-coast near Holywood.]

4. *equestris*. D. viridi-æneus, antennis nigris, hypostomate flavo-aureo, pedibus ferrugineis, tarsis apice posticis totis nigris, alis intus exangulatis.

(*Mas.*) femoribus posticis nigro villosis; tarsis anticis gracillimis, articulo ultimo compresso atro.

Long. corp. $2\frac{1}{4}$.

D. unguato similis at duplo minor: Coxæ anticæ nigræ subtus apice ferrugineæ: Tarsi antiqui quam in *D. brevipennis* longiores et graciliores, articulo ultimo compresso atro et brevior quam 4^{to}; tarsi anteriores basi ferruginei postici toti ut et apex tibiæ nigræ: Alæ intus exangulatae ut in *D. acuticorni*.

¶ A single male on the sea-coast, Holywood.]

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5. *planitarsis*. *D.* obscure æneo-viridis, hypostomate candido, antennis femoribus anterioribus pedibusque posticis nigris.

(*Mas.*) femoribus imberbibus, articulo ultimo tarsorum intermediorum clavato atro.

Meig. IV, 81, 25.

Fall. Dol. 12, 8.

Long. corp. $2\frac{1}{3}$.

¶ A single male near Holywood, 1827.]

6. *campestris*. *D.* fusco-æneus, incisuris abdominis nigris, pedibus nigris, tibiis ferrugineis, alis cinerascens, hypostomate griseo.

Meig. IV, 78, 8.

Long. corp. $2\frac{1}{3}$.

¶ Two females on the sea-coast, Holywood.]

Var. β, obscurior, hypostomate nigro vix sericante.

Long. corp. vix 2.

Confer *D. fuscipodem* infra No. 22 ciliis albis alarum nervo 4^{to} magis flexo.

¶ Ibid. one female.]

7. *atratus*. *D.* obscure æneus, pedibus nigris, alis latis apice nigricantibus.

(*Mas.*) femoribus imberbibus, metatarso postico hispido.

Meig. IV, 76, 3.

Long. corp. $2\frac{1}{3}$.

¶ Taken near Canterbury in May.]

8. *fastuosus*. *D.* viridi-cyaneus, antennis pedibus et incisuris nigris, hypostomate candido, alis ad costam infuscatis.

(*Mas.*) femoribus imberbibus, alis postice latius excisis.

Long. corp. 3.

Pedes longissimi, metatarsus posticus in ♂ haud hispidus: Alæ solito longiores postice fere per totam longitudinem æqualiter angustatæ: Halteres pallidi; Lamellæ albidæ nigro marginatæ.

Confer *D. cyaneum*, Meig. IV, 78, 9, alis in ♂ rotundatis; etiam *D. picipodem*, Ibid. 76, 4, metatarso postico hispido.

¶ One male near Holywood, 1827.]

B. *Ciliis genarum pallidis.*

a. *Lamellis maris pallidis.*

9. *nitidus*. D. æneo-viridis, hypostomate flavo, antennis basi subtus rufis, pedibus pallide ferrugineis tarsis nigris, alarum nervo 4^{to} rectangulatim fracto; (*Mas.*) femoribus posticis fusco-villosis.

Fall. Dol. 12. 9.

Long. corp. $2\frac{3}{4}$.

Coxæ anticæ griseæ apice pallidæ; villi femorum in ♂ rariores quam in *D. unguato*. Alæ obscure hyalinæ in ♂ ♀ similes nisi quod in illo adsit lineola parva costalis minus conspicua quam in sequente.

N. B. *D. nitidus*, Meig. IV, 80, 12, alia species antennis nigris coxis anticis ferrugineis.

¶ Not uncommon on the sea coast, Holywood.]

10. *festivus*. D. aureo-viridis, antennis rufis apice nigris, coxis anticis et pedibus pallidis, alis latissimis nervo 4^{to} subangulato.

(*Mas*) femoribus posticis pallido villosis.

Long. corp. 3.

Hypostoma flavescens aut argenteum: Palpi straminei: Coxæ pallidæ posteriores basi nigricantes: Tarsi anteriores subgraciles, maris paulo longiores metatarso pallido apice nigro, postici toti nigri ut et apex tibiæ: Alæ utriusque sexus latissimæ nervo transversa subarcuato, 4^{to} plus minus subangulato, dilute cinereæ, maris lineola costali atra.

D. nitido Fall. similis at colore lætiore, &c. distinguendus.

¶ Sea coast, Holywood, rare.]

11. *Diadema*. D. obscure æneus, antennis nigris, hypostomate producto argenteo, pedibus fusco-pallidis, alarum nervo 4^{to} rectangulatim fracto.

(*Mas*) alis hyalinis, femoribus imberbibus, tarsis anticis subcrassioribus.

Long. corp. $2\frac{1}{2}$.

Hypostoma super os productum niveo-argenteum, altero situ cum palpis stramineum: Thorax æneo et fusco lineatus ad latera cinereus: Abdomen cinereo tessellatum lineâ dorsali et incisuris nigris: Lamellæ albæ margine parcius nigro ciliatæ: Pedes obscure lutescentes: Coxæ basi fuscæ apice pallidæ anteriores albo sericantes: Femora plerumque fusco tincta: Tarsi anteriores basi lutescentes, antichi crassiusculi breviores quam in *D.*

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nitido, Fallen. Alæ maris hyalinæ angustiores quam in illo, feminae versus costam cinereæ; margo posticus ad nervum 5^{tum} acute incisus.

A *D. nitido*, Meig. differre videtur colore obscuriore hypostomate et coxis.

¶ Very common on the sea coast at Holywood.]

12. *popularis*. D. æneo-viridis, hypostomate flavo, antennis rufis apice nigris, coxis anticis pedibusque rufis.

(*Mas*) tarsis intermediis articulis 3^{tio} et 4^{to} brevibus dilatatis ciliatis atris, ultimo minuto candido, alis postice sinuatis.

Fall. Dol. 11, 7.

Meig. IV, 91, 30.

Long. corp. 2 $\frac{3}{4}$.

Tarsi antici apice postici fere toti nigri: Hypostoma feminae albidum: Alæ obscure hyalinæ: Femora maris imberbia.

¶ Not rare about Holywood.]

13. *pennatus*. D. æneo-viridis, hypostomate flavo, antennis nigris basi rufis, coxis anticis pedibusque rufis, tibiis posticis apice tarsisque nigris.

(*Mas*) tarsis intermediis articulis 2^{do} et 3^{tio} brevibus dilatatis ciliatis atris, tibiis posticis crassioribus prope basin intus variolosis, alis postice sinuatis.

Meig. IV, 90, 28.

Long. corp. 2 $\frac{3}{4}$.

Alæ maris paulo angustiores quam in præcedente: Femora imberbia: Hypostoma feminae albidum.

¶ ♂ ♀ Holywood, 1827.]

14. *urbanus*. D. æneo-viridis, hypostomate candido, antennis rufis apice nigris, coxis anticis et pedibus rufis, tarsis nigris.

(*Mas*) tarsis intermediis basi rufis articulis 2^{do} 3^{tio} et 4^{to} nigris, ultimo albo, alis postice sinuatis.

Meig. IV, 92, 31.

Long. corp. 2 $\frac{1}{2}$.

In meo specimine alæ magis coloratæ quam in præcedentibus, femora maris imberbia.

¶ ♂ Holywood, 1827.]

15. *pennitarsis*. D. æneo-viridis, hypostomate aureo, antennis rufis

apice nigris, coxis anticis et pedibus ferrugineis, tibiis posticis apice tarsisque nigris anticis basi pallidis.

(*Mas*) metatarso intermedio late pennato atro, alis hyalinis postice sinuatis.

Fall. Dol. 11, 6.

Meig. IV, 90, 29.

Long. corp. $2\frac{1}{3}\frac{1}{4}$

Maris cilia straminea: Femora imberbia: Hypostoma feminae argenteum.

Var. Minor alis brevioribus latioribus postice minus emarginatis.

Var. pedibus et coxis anticis pallidioribus tarsis anticis vix apice fuscis, posticis ad basin et apice tibiæ pallidis.

Var. metatarso intermedio angustius ciliato.

¶ A common and diffused species.]

16. *acuticornis*. D. æneo-viridis, antennis acutis flavis apice nigris, coxis anticis et pedibus pallidis, tarsis posticis nigris, alis intus exangulatis.

(*Mas*) antennis elongatis, femoribus imberbibus.

Fall. Dol. 12, 10.

Meig. IV, 94, 34.

Long. corp. 2.

Antennæ feminae acutæ sed vix elongatæ: Alæ hyalinæ.

¶ ♂ ♀ near Holywood, rare]

17. *thalassinus*. D. læte viridis, antennis rufis apice nigris, coxis anticis pedibusque pallide ferrugineis tarsis nigris, alis latioribus intus fere exangulatis.

(*Mas*) femoribus imberbibus, hypostomate flavo.

Long. corp. $2\frac{1}{4}$.

Tarsi antici graciles simplices metatarso pallido apice nigro, metatarsus intermedius vel totus niger vel basi pallidus: Feminae hypostoma argenteum et antennæ fere totæ rufæ etiam coxæ omnes in illâ ferrugineæ posterioribus tantum basi infuscatis: Alæ obscure hyalinæ intus subrotundatæ nec incisæ ad nervum 5^{tum}, lineola costalis in ♂ omnino nulla.

¶ Holywood: and Bexley (in Kent).]

18. *trivialis*. D. viridi-æneus, hypostomate flavo, antennis basi subtus rufis, coxis anticis et pedibus ferrugineis, tarsis nigris anterioribus basi ferrugineis.

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(*Mas*) tarsis anticis articulis 2^{do} et 3^{tio} subtus concavis, femoribus posticis pallido villosis.

Long. corp. $2\frac{1}{4}$.

Statura et fere color *D. unguhati*, at abdominis incisuræ vix nigræ : Alæ paulo latiores obscure hyalinæ, ♂ lineolâ costali ut in illo brevissimâ, ad nervum 5^{um} haud incisæ ut in *D. festivo* : Tarsi antici breviores quam in præcedente : Femora immaculata : Femina antennis tantum apice nigris, alis dilute fusco hyalinis, hypostomate albicante.

¶ Not uncommon near Holywood.]

19. *inquinatus*. *D.* obscure viridis, hypostomate candido, antennis nigris, pedibus luteis, femoribus tibiisque posticis apice tarsisque nigris, alis extus ad costam fuscis.

(*Mas*.) femoribus imberbibus.

Long. corp. $2\frac{1}{4}$.

Hypostoma feminae albidum : Lamellæ maris lutescentes : Femora postica apice summo infuscata : Nervus 4^{tus} alarum magis determinate flexus quam in præcedentibus : Coxæ anticæ cinereæ in ♀ apice latius lutescentes : Abdominis incisuræ nigricantes.

¶ Common on the sea coast, Holywood.]

20. *Actæus*. *D.* nigro-viridis, antennis nigris, hypostomate candido, coxis anticis et pedibus pallide luteis, femoribus tibiisque posticis apice tarsisque nigris, alis nigricanti hyalinis immaculatis.

(*Mas*.) nervis alarum tenuissimis, femoribus imberbibus.

Long. corp. 2.

Abdominis incisuræ nigricantes : Coxæ anticæ, albo sericantes : Lamellæ ♂ albidæ tenuiter nigro-marginatæ pilis nullis longioribus : Hypostoma ♂ candidum, ♀ albidum : Alæ extus latiores at vix postice sinuatæ nervo 4^{to} determinate flexo, lineolâ nullâ costali : Femora sæpius immaculata in ♀.

¶ Sea coast, Holywood, not rare.]

21. *vitripennis*. *D.* obscure æneus, hypostomate candido, antennis pedibusque nigris tibiis ferrugineis, alis hyalinis extus latioribus (*Mas*) alis intus subsinuatis, femoribus imberbibus.

Meig. IV, 78, 7.

Long. corp. 2.

Thorax cinereo lineatus : Abdomen ad latera cinerascens incisuris

nigris: Tarsi anteriores basi ferruginei: Tibiæ posticæ apice nigræ: Lamellæ maris albæ nigro marginatæ.

Var. viridi-cyaneus nitidus abdomine æneo.

¶ Common on the sea coast, Hollywood.]

22. *fuscipes*. D. obscure æneus, hypostomate albo, antennis pedibusque nigris tibiis ferrugineis, alis obscuris (*femina*.)

Long. corp. $2\frac{1}{4}$.

Præcedenti similis sed alæ obscuriores nec dilatatæ: Coxæ apice trochanteres genua tibiæ tarsi anteriores basi et plaga longitudinalis femorum posticorum ferruginei; Tibiæ posticæ apice nigræ: *Mas* incognitus.

¶ Ibid. two females.]

23. *clavipes*. D. obscure æneus, hypostomate candido, antennis pedibusque nigris, tibiis ferrugineis (*Mas*) posticis clavatis compressis sulcatis vix basi ferrugineis, femoribus albido-villosis.

Long. corp. vix 2.

Alæ quam in *D. vitripenni* angustiores nec sinuatæ subhyalinæ: Tarsi antiqui quam in illo breviores: Femora postica crassiuscula villis longioribus albidis: Coxæ ad apicem trochanteres tibiæ et basis tarsorum anticorum ferruginei: Abdomen incisuris vix nigricantibus: Lamellæ ♂ albidæ nigro marginatæ.

¶ One male, ibid.]

b. *Lamellis maris nigris*.

24. *plumipes*. D. thorace ferrugineo, abdomine olivaceo, articulis 4 ultimis tarsorum anticorum brevibus in mare dilatatis nigris, antennis nigris basi rufis.

Meig. IV, 87, 23.

Fall. Dol. 14, 13.

Long. corp. $2\frac{1}{2}$.

In meo specimine maris metatarsus anticus niger apice nonnihil dilatatus (num diversa? tamen notæ reliquæ optime conveniunt.)

¶ Hollywood, 1827.]

C. *Nervo 4^{to} alarum subrecto; Ciliis genarum nigris rarioribus.*
(Femora ♂ omnibus imberbia.)

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25. *cupreus*. D. obscure cupreus, hypostomate albo, antennis pedibusque nigris, tibiis ferrugineis, alis fuscis.

(*Mas*) lamellis nigris.

Meig. IV, 98, 42.

Fall. Dol. 15, 15.

Long. corp. 2.

¶ A common and generally diffused species.]

26. *Sarus*. D. obscure viridi-æneus, capite albido, pedibus lutescentibus tarsis apice nigris, alis cinereis, antennarum setâ pubescente.

(*Mas*) lineolâ costali nigrâ, lamellis fusco-luteis.

Long. corp. vix 2.

Antennæ nigræ: Frons et hypostoma albidæ: Thorax absque lineis versicoloribus: Halteres pallidi: Alæ maris angustiores quam feminæ, lineolâ costali brevi crassâ nervum 1^{um} subcostalem haud attingente: Coxæ nigro-cinereæ: Femora antica et apex posticorum supra infuscati: Metatarsus posticus brevissimus.

¶ A pair near Holywood.]

Confer *D. celerem*, Meig. IV, 84, 18, et *vividum*, 100, 48.

27. *ærosus*. D. obscure æneo-viridis, antennis nigris, pedibus ferrugineis coxis nigricantibus, hypostomate (*mas*) nigro aut (*femina*) albido.

Meig. IV, 98, 43.

Long. corp. 1—1½.

Lamellæ maris nigræ, femora postica supra sæpius fusca.

¶ Common and generally diffused.]

28. *nigripennis*. D. obscure æneus, coxis pedibusque nigris, tibiis anterioribus rufescentibus, alis fuscis.

Meig. IV, 102, 52.

Fall. Dol. 15, 16.

Long. corp. 1½.

Lamellæ maris nigræ. Os rostriforme productum et brevius quam in *Orthochile nigrocærulea*.

¶ A rather common and generally diffused species.]

* I have yet another species of this section from the west of Ireland: it is larger than *D. ærosus*, with pale lamellæ, but I have not yet sufficiently investigated its characters.

ORTHOCHILE. Meig. IV, 103, CXXXI.

1. *nigrocærulea*. Meig. IV, 103, 1.

Latr. Gen. Crust., &c. IV, 289.

Long. corp. $1\frac{1}{4}$.

¶ I found both sexes near Bexley in June.]

References to the Figures. TAB. XV.

1. *Orphnephila devia* ♀.
2. Side view of the body.
3. A wing.
4. Forefoot.
5. Hind *tarsus*.
6. The head ; the *antennæ* being removed, except the basal joint.
7. The *antenna* without the radical joint.
- 8 and 9. The *trophi*.
10. Hind *metatarsus* of *Plectropus*.
- 11 and 12. *Machærium Maritimæ*.

{	<i>a. antenna.</i>
	<i>e. clypeus.</i>
	<i>b. haustellum.</i>
	<i>g. labrum.</i>
	<i>m. mandible.</i>
	<i>n. maxilla.</i>
	<i>o. Tongue.</i>
	<i>f. labella.</i>
{	<i>c. Maxillary palpus.</i>

ART. XLIX. *Analytical Notices of Books.*

Nova Acta Physico-Medica Academiae Cæsareæ Leopoldino-Carolinæ Naturæ Curiosorum. Tomus XIV.—Bonnæ 1828.

IN resuming our analysis of this valuable collection of memoirs, our attention is again directed in the first instance to a theory “de la cause de l’Hybernation chez les Animaux Dormeurs.” The paper now before us, written by Dr. Pastré, is, however, of a very different character from that by Dr. Otto, with which we commenced our notice of the previous volume. Instead of proceeding on the basis of anatomical facts, it is entirely theorectical in all its parts, and the “physiological abstraction” on which it professes to be founded, is, we are reluctantly obliged to confess, too subtle for our comprehension. To avoid misconception, we give in the authour’s own terms, the statement of the immediate and essential cause of hybernation, contained in his concluding paragraph “The principle of life,” he says, “is no longer occupied with nutrition, or assimilation, or the perception of external objects; it breaks off almost all communication with the moral or instructive faculty; realizes a sort of *asphyxia* by means of the *power of fixed situation*; and by this means preserves the animal body in all its physiological integrity.” It may fairly be questioned whether these conditions are not rather the symptoms than the cause of a state of hybernation, on the *modus operandi* of which state, (dependent as it is universally admitted to be on a peculiar idiosyncrasy), such general observations as those contained in the present paper are calculated to throw but little light.

Dr. Rathke’s Essay “Ueber die Entwicklung der Athemwerkzeuge bei den Vögeln und Säugthieren” is, like all the writings of that acute anatomist, replete with novel and interesting matter. The gradual developement of the respiratory organs in Birds and Quadrupeds is

followed up from their first appearance to their complete evolution ; and the various gradations of form which they successively assume, at different periods and in different animals, are traced with great minuteness. Of the facts thus ascertained the most important, as well as the most unexpected, is the existence in the higher Classes of *Vertebrata*, at a very early period after the impregnation of the *ovum*, of organs corresponding to the the temporary *branchiæ* of the Batrachian Reptiles, and the permanent gills of Fishes. The discovery of these organs in the egg of the common fowl was first announced by Dr. Rathke in the “*Isis*” for 1825 ; and afterwards extended by him to the embryos of Swine, Horses and several ruminating Quadrupeds, and finally to that of the human species. Several other comparative anatomists have since turned their attention to the same object ; and their labours have produced not only a positive corroboration of the observations of the original discoverer, but also much additional information. The most successful of these investigators are M. Huschke, whose papers also appeared in the “*Isis*” ; and Dr. von Baer, whose memoirs are contained in Meckel’s Archives of Physiology, and in the “*Annales des Sciences Naturelles.*” So much in fact has been written on this highly important discovery both previously and subsequently to the publication of the paper now before us, that it would be impossible to do justice to the subject by a simple abstract of its contents ; while to enter into a general analysis of all the papers to which we have referred would occupy too much of our space. We must therefore rest content with having indicated where ample information may be found by those who are desirous of entering fully into this curious investigation. For the benefit of those who may not have it in their power to make these references, but who may be desirous of verifying for themselves the leading facts on which the theory is based, it may not be superfluous to add, that the period when the branchial apertures on the sides of the neck, and the vascular arches to which they lead, are most distinctly visible, is, in the egg of the common fowl, about the third or fourth day of sitting ; in the embryo of the Swine, about three weeks after impregnation ; and in the human subject, about the fifth week of gestation.

The next paper, following our usual order of reference, relates to a “*Schädel-und Kopf-mangel an Embryonen von Schweinen,*” and contains

a very curious, although for the present an isolated, observation indicative of the early period at which the embryo may exhibit a monstrous formation. Among the *ova* contained in the *uterus* of a sow, and which from their magnitude and degree of development, appeared to have just passed the third week of their growth, Dr. Von Baer observed one of much smaller size, but which, on being opened, was found to contain two diminutive *sacculi*, having the appearance of hydatids. In one of these sacs, the larger of the two, was found an embryo, deficient in the skull; and in the other, which was extremely minute, a second without any vestige of head and destitute also of the anterior part of the body. In both these embryos, notwithstanding their small size, the development of the abdomen and limbs was such as to evince that they had been expelled from the ovary at the same time with the other *ova* among which they were found. The authour thinks it improbable that these embryos could ever have attained their full growth; and states his belief that the deficiency of skull and head at so early a period can only be accounted for by assuming this monstrosity to have its origin in the ovary itself, although the want of skull may also frequently be the consequence of *hydrocephalus*.

In a paper "Ueber die geheilte Verletzung eines Fossilen Hyänen-Schedels," by Samuel Thomas von Sœmmering, we have an exposition of some of the latest opinions of that great anatomist on the subject of fossil bones. The object of the paper is to illustrate the fossil skull of a hyæna, remarkable for an extensive fracture of its occipital crest, which had entirely healed, although in a very irregular manner. Of this skull some account had previously been given both by M. Cuvier and by Dr. Buckland, who concurred in opinion that the injury was the result of a bite, inflicted, according to M. Cuvier, either by its fellow hyænas or by the lions and tigers, the bones of which found in the same cavern prove them to have inhabited the same locality. Dr. Buckland does not admit the latter conjecture, and M. Sœmmering agrees with him in thinking that the bite was received from another hyæna. His paper commences with an enumeration of the places in which fossil remains of hyænas have hitherto been found, and of the figures of them that have been published from time to time. He states that fossil skulls of hyænas appear to be more rare in Germany than those of bears; and minutely compares one

figured and described by Collini, in the “*Acta Academiæ Theodoro-Palatinæ*” for 1784, with a recent skull of the *Hyæna Crocuta*. From this comparison he concludes that the recent and fossil species can scarcely be distinguished from each other; an inference strengthened by a similar comparison of a fossil bear’s skull from Gailenreuth with a recent one from Lithuania, and of a portion of the fossil lower jaw of a wolf from the same Cavern with a recent lower jaw from Salzburg. “There existed therefore, he says, “in the primitive world, a species of *Hyæna*, of Bear, and of Wolf, which can with difficulty be distinguished from living species of those genera.”

The authour next proceeds to compare the skull which forms the immediate subject of his paper with that of Collini, and finds that it belongs, as Cuvier had previously remarked, to a distinct species, *Hyæna fossilis* or *spelæa*; the distinguishing characters between which and the other hyænas, both recent and fossil, are stated to consist in the greater shortness of its facial when compared with its cerebral portion, the greater prominence of its forehead, and its general colossal stature. Its substance is carefully investigated, and it is shewn to have belonged to an adult and probably an aged individual. The nature of the wound and the mode of its reparation are then considered at length, and illustrated by valuable observations with regard to the formation of *callus*, and the other stages of union in the bones both of men and animals. By the application of the principles thus obtained to the fossil in question, it is shewn, as might indeed have been conjectured *a priori*, that in the primitive world the union of broken bones in the *Mammalia* was produced in the same manner as at the present day. Then follow the authour’s reasons for believing the injury to have resulted from the bite of a hyæna; and the paper concludes with the expression of a belief that the fossil hyæna to which this skull belonged had its primitive abode at no great distance from the place where its remains were found after some thousands of years; and with a retraction of the early opinion of the authour, founded on imperfect data, that the fossil remains found in the Gailenreuth cave had been deposited there by the hands of man.

M. Constantin Gloger’s *Memoir “Ueber den Nestbau der Zwergmaus &c.”* contains the description of two very different nests, in each of

which was found a litter of the young of *Mus minutus*, Pall. a species regarded by the authour as identical with the *Mus messorius* and *Harvest-mouse* of Shaw and Pennant. The most artificial of these nests, which in skilfulness of construction was fully equal to that of most birds, was suspended from the summit of three straws of the common reed (*Arundo Phragmites*, L.) and was entirely composed of the panicles and leaves of the plants, slit longitudinally and intricately plaited and matted together. Its internal cavity was small and round, and accessible only by a narrow lateral opening. From the peculiarity of its structure, there can be little doubt that this curious nest was fabricated by the animal itself, and not merely adopted by it; and this conclusion is confirmed by the description of a similar nest, also containing young, found in the neighbourhood of Berlin, by a pupil of Professor Lichtenstein, through whom the account of this discovery, inserted at the end of the volume, was communicated to the authour. The value of the paper is much enhanced by the general observations with which it commences on the stimulus by which Birds and Quadrapeds are impelled to construct their habitations; and by the comparison which follows of the means possessed by each class as a whole, as well as by the individual species composing it, for carrying this impulse into effect.

The “Versuch einer Natürlichen Eintheilung der Vögel, von Dr. F. A. Ritgen,” is a specimen of the trichotomous system, applied to the classification of birds. This arrangement professes to be founded on the modifications of the *pelvis*, coincident with those of its locomotive appendages, and with corresponding variations in the functions of these parts, so important in determining stations and habits. No details, however, are given of the structural characters employed; those which depend on the *pelvis* being expressly reserved for another opportunity. The subdivisions appear to be the result of a comparison of structure and habits: thus for instance the primary distribution into three series, as they are termed, is effected either in conformity with habits, according as the abode of the birds is more peculiarly the water, the dry land, or the marshes; or with reference to structure, according as the hinder limbs serve more the purposes of fins, of hands, or of feet. The following tabular view will give an idea of the manner in which the authour follows

out his system. It should be observed that to each of his divisions he usually gives two distinguishing names, the one functional and the other structural. In order to avoid giving up too much of our space to a mere catalogue of hard words, we quote one only, and the former in preference to the latter.

Series I. HYGRORNITHES.

Tribe I. HALICOLYMBI.

- Fam. 1. Orthocolymbi, (*Colymbus*, L.)
- 2. Dyseretæ, (*Alca*, L., *Uria*, Briss.)
- 3. Eretæ, (*Aptenodytes*, Forst.)

Tribe II. HALIPTENI.

- Fam. 4. Colymbopteni, (*Pelecanidæ*, Leach.)
- 5. Plotopteni, (*Laridæ*, Leach.)
- 6. Colymboploteres, (*Mergus*, L.)

Tribe III. PLOTERES.

- Fam. 7. Tachyploteres, (*Anas*, Meyer.)
- 8. Orthoploteres, (*Anser*, Meyer.)
- 9. Baryploteres, (*Cygnus*, Meyer.)

Series II. XERORNITHES.

Tribe I. CHOROPTENI.

- Fam. 10. Dromochoropteni, (*Otis*, L., *Charadriadæ*, Leach, *Ortygis*, Ill.)
- 11. Baterochoropteni, (*Tetraonidæ*, Leach, *Phasianidæ*, Vig., *Cracidæ*, Vig.)
- 12. Herpochoropteni, (*Columba*, L.)

Tribe II. HYLOPTENI.

Sect. I. HYLOCHASMOPTENI.

- Fam. 13. Hylochasmopteni, (*Caprimulgus*, L., *Steatornis*, Humb., *Cypselus*, Ill., *Hirundo*, L., *Muscicapa*, L., *Edolius*, Cuv., *Platyrhynchus*, Desm., *Trogon*, L.)

Sect. II. HYLOCLASMOPTENI.

- Fam. 14. Orthaepyrhynchi, (*Fringilla*, L., *Emberiza*, L., *Buphaga*, L., *Phytotoma*, Mol.)
- 15. Simaepyrhynchi, (*Glaucopis*, Gmel., *Tanagra*, L.,

Myiothera, Ill., *Ampelis*, L., *Lanius*, L., *Prionites*, Ill., *Philedon*, Cuv.

Fam. 16. *Macraeopyrhynchi*, (*Pogonias*, L., *Corythaix*, Ill., *Bucco*, L., *Loxia*, L., *Crotophaga*, L., *Scythrops*, Lath., *Musophaga*, Isert, *Buceros*, L., *Ramphastos*, L.)

Sect. III. HYLOTRYPANOPTENI.

— 17. *Microthorhynchi*, (*Pipra*, L., *Cinclus*, Bechst., *Sturnus*, L., *Oriolus*, L., *Cassicus*, Cuv., *Turdus*, L., *Alauda*, L., *Parus*, L., *Motacilla*, L.)

— 18. *Macrothorhynchi*, (*Alcedo*, L., *Merops*, L., *Galbula*, L., *Upupa*, L., *Certhia*, L., *Trochilus*, L., *Sitta*, L., *Picus*, L., *Yunx*, L., *Cuculus*, L.)

— 19. *Hypsorthorhynchi*, (*Coracias*, L., *Corvus*, L., *Gracula*, L., *Paradisea*, L.)

Tribe III. HYPLOPTENI.

Fam. 20. *Hylypsopteni*, (*Psittacus*, L.)

— 21. *Nyctypsopteni*, (*Strix*, L.)

— 22. *Hemerypsopteni*, (*Ophiotheres*, Vieill., *Vulturidæ*, *Falconidæ*.)

Series III. MYDALORNITHES.

Tribe I. LIMNOPTENI.

Fam. 23. *Limnopteni*, (*Porphyria*, Briss., *Fulica*, L., *Gallinula*, Briss.)

— 24. *Limnemicolymbi*, (*Phalaropus*, Vieill., *Parra*, L., *Channa*, Ill., *Crex*, Bechst., *Rallus*, L.)

— 25. *Limnodromi*, (*Scolopax*, L., *Vanellus*, Briss., *Actitis*, Ill., *Numenius*, Briss., *Ercunetes*, Ill., *Strepsilas*, Ill.)

Tribe II. PARALIMNOPTENI.

Fam. 26. *Limnobateres*, (*Platalea*, L., *Phænicopterus*, L., *Recurvirostra*, L.)

— 27. *Limnorthopteni*, (*Cancroma*, L., *Tantalus*, L., *Ciconia*, Briss., *Grus*, Pall., *Ardea*, Briss., *Scopus*, Briss., *Eurypyga*, Ill., *Anastomus*, Ill.)

— 28. *Paralimnodromi*, (*Glareola*, Gmel., *Chionis*, Forst., *Cercopis*, Lath., *Psophia*, L., *Palamedea*, L., *Dicholophus*, Ill.)

Tribe III. PEDINORNITHES.

- Fam. 29. Ochteraptenodytes, (*Didus*, L.)
—— 30. Choraptenodytes, (*Casuarius*, Briss., *Rhea*, Briss.)
—— 31. Ammaptenodytes, (*Struthio*, L.)

As we are not supplied with either the facts or the reasoning on which this "Natural distribution of Birds" is founded, it would be absurd to enter into a discussion of its merits. It certainly affords evidence of some ingenuity, if only in the construction of the Greek compounds with which, in common with many German systems of the present day, it abounds. Indeed it might almost be said, with reference to the classification before us, that in its present state, and until it shall have received further elucidation, it consists of little else but these new terms, many of which, to say the least, are sufficiently cramp. We have already [Zool. Journ. IV. 255] had occasion to refer to the extreme to which this propensity is carried on the part of our authour, and we shall find it, if possible, still more strongly marked in a paper on the arrangement of the *Amphibia*, also contained in the present volume. From the composition of such terms, however high-sounding they may be, there accrues little credit to a writer, and less advantage to science. How much more usefully would the learned authour have been employed in more minutely following up the observations on the distribution of the different families and genera over the surface of the earth, with reference chiefly to station and physical geography, which form the conclusion of his paper. The subject lightly touched upon in these concluding pages well deserves a profound investigation.

An Essay, "Ueber den Fabricischen Beutel der Vögel," by Dr. A. A. Berthold, is an attempt to determine the function of the organ known as the *Bursa Fabricii*, in Birds. The authour first passes in review the opinions held upon this subject by different writers: viz. by Fabricius ab Aquapendente, its discoverer, who conjectures that it serves in the female as a reservoir for the male *semen*; by Perrault, who compares it to the anal *sacculi* and glands of certain Carnivorous Quadrupeds; by Schneider, who somewhat fantastically imagines that it receives and matures the eggs; and by Blumenbach, who attributes to it no definite function, but assumes that it properly belongs to the male, and is only

rudimental in the female. After controverting all these different views, the authour states his own opinion, that the *Bursa Fabricii* is the Urinary Bladder of Birds. His reasoning is grounded on the situation of the organ, and its *embouchure* in the *cloaca*; on the frequent occurrence of urine within it; on its being furnished with a muscular coat; and on its great development in the foetal state, compared with the gradual diminution which it undergoes in the older birds. It seems probable, however, that in positively affirming this organ to be itself the urinary bladder, the authour has somewhat overstated his own opinion, which may, perhaps, be more accurately collected from the following passage, with which he concludes his paper:—"The *cloaca* of Birds," he says, "is a Urinary Bladder, into which the *rectum* opens; on its anterior side the *allantois* passes off, in the *fœtus*, in the shape of a small process. But the *Bursa Fabricii* is also a subdivision of the *cloaca*, and consequently a subdivision of the urinary bladder, which, like the *allantois*, plays an important part during the state of *fœtus*. The *bursa* bears the same relation to the entire *cloaca*, as one of the *cornua uteri* does to the entire *uterus*. In the same light must we consider the bladders of *Amphibia* and Fishes, which contain partly urine, and partly peculiar secretions. For this reason, I regard the *bursa* not as an anal gland, not as a receptacle of the eggs, not as an organ performing an indefinite function in the one sex, and merely rudimental in the other, but as a subdivison of the urinary bladder of birds, separated from the *cloaca*, serving in the foetal state especially as a respiratory organ, but remaining to an after period of life, and containing urine like all other urinary bladders."

A second Memoir by M. Constantin Gloger, "zur Naturgeschichte des Weissbindigen Kreuzschnabels," contains a minute account of the characters, habits and mode of life of the *Loxia tænioptera*, Glog., with conjectures as to its original country. This species, single specimens of which have been occasionally met with in Sweden and various parts of Germany, occurred in considerable numbers in Silesia and Thuringia in the autumn of 1826. Although the arguments advanced by the authour in his text tend to prove that its migration took place from Asia rather than America, there can be little doubt, as he himself confesses in a note, that the bird is identical with an American species, *Loxia*

leucoptera, Gmel. or more properly *L. falcistrostra*, Lath. It is also the *Crucirostra bifasciata* of Brehm's "Ornis."

We have now arrived at Dr. Ritgen's "Versuch einer natürlichen eintheilung der Amphibien," in which the *Amphibia* (including the *Reptilia*) are subjected to a similar process of subdivision with the Birds; and apparently also on principles nearly similar, the presence or absence and modifications of the external limbs, serving as the basis of the classification. We had intended here also to have given a tabular view of the arrangement, but the length to which it would extend, the little advantage to be derived from such a view unaccompanied by any of the details on which it is founded, and our dislike to fill our pages unnecessarily with such words (if words they can be called) as *Atryptodontopholidophides* and *Bdalsipodobatrachi*, induce us to forbear such an infliction on the patience of our readers. The arrangement of Birds already given must therefore serve as a specimen of the authour's mode of systematizing. He seems, it is true, somewhat more at home in the present branch of his subject, but we doubt much whether he has succeeded better in developing the "Natural distribution;" which, it is still necessary to repeat, and perhaps ever will be so, can never be attained by the study of isolated characters, however important the organs from which they are derived.

Prince Maximilian of Wied's Memoir "Ueber den Quetz Paleo des Seba," contains a minute description of the animal which he now regards as the *Uromastix cyclurus*, Merr., a species hitherto resting solely on the figure and description given by Seba. The authour also gives new distinctive characters of the nearly related genera *Uromastix* and *Tropidurus*, a species of which latter discovered by himself in Brazil, *Trop. torquatus*, he had formerly considered identical with the Quetz Paleo of Seba. The true Quetz Paleo was found by Dr. Boie on opening the body of a specimen of the *Coluber Lichtensteinii*, Max., contained in a collection of *Amphibia* transmitted to Leyden from South Brazil.

This paper is succeeded by one communicated by Fr. Boie "Ueber eine noch nicht beschriebene Art von *Cordylus*, Gron.," containing the description of a second species of the genus *Cordylus*, Daud. It is founded on a single specimen in the Leyden Museum, named by the authour and his brother *Cord. cataphractus*.

A third Herpetological Memoir derived from the investigation of the treasures contained in the magnificent collection of the Leyden Museum, is entitled, "Untersuchung der Speicheldrüsen bei den Schlangen." Its chief purpose is to make known an important fact in the economy of certain snakes, in regard to which much uncertainty existed, their bite having sometimes been found fatal, while at others it is perfectly harmless. This anomaly is clearly accounted for by an observation first made by Prof. Reinwardt on the *Dipsas dendrophila* of Java, afterwards extended by Dr. Boie to other species of *Dipsas* and *Homalopsis*, and still further confirmed in several other genera by M. Schlegel, the authour of the present paper. All these snakes have teeth nearly similar in character to those of the genus *Coluber*, excepting that the last on either side of the upper jaw is longer than the rest, and has a deep *sulcus* on its anterior surface, the base of which corresponds, as in the true poisonous fangs, with the termination of the excretory duct of a poison-secreting gland. As the sulcate poison-teeth stand much farther back within the mouth than the fangs of Vipers, Rattle-snakes, &c. it is obvious that the danger resulting from the bite of the snakes that possess them is contingent on the extent to which the mouth is opened in the act of biting, or in other words on the participation or non-participation of the hinder teeth in the infliction of the wound. There exists a direct transition from the snakes in question to the true poisonous snakes by the intervention of *Elaps*, *Naja*, *Bungarus* and *Trimeresurus*, in which the anterior portion of the upper jaw is gradually shortened, the imperforate anterior teeth become fewer in number, and the elongated posterior tooth is perforated as in the Vipers, but has in addition an anterior fissure communicating with the whole length of the cavity. These modifications are well represented in a plate accompanying this important memoir.

The only Ichthyological paper in the present volume is the commencement of a "Vergleichende Betrachtung des starren Gerüstes welches das "Fortpflanzungsgeräthe trägt und umgiebt," by Dr. Ritgen. In this first section of his proposed comparative osteology of the *pelvis* and its auxiliary bones and cartilages, the authour confines himself, with the exception of a few general observations, to the description of these organs as they exist in Fishes, the lowest animals in which they can be clearly demonstrated, unless we consider as the commencement of a *pelvis*

the rudimental bones found in some Cephalopodous *Mollusca*. The details of the modifications observed in different fishes, which constitute the principal value of this paper, will not admit of a satisfactory analysis; we can therefore only indicate them as containing much interesting information for the comparative anatomist. They are partly original and partly selected from the works of previous writers on the Osteology of Fishes.

Two species of *Auricula*, Lam., found in turning over the plants collected by him in the Island of O-Wahu, constitute the "Species Novas Conchyliorum Terrestrium, (quas) ex Insulis, Sandwich dictis, attulit Adelbertus de Chamisso." They are here described and figured as the *Auriculæ O-waihiensis* and *sinistrorsa*; and an indication is also given of a third, of which only a fragment was observed.

Dr. Otto's "Beschreibung einiger neuen, in den Jahren 1818 und 1819, in Mittelländischen Meere gefundener Crustaceen," contains detailed descriptions, accompanied by coloured figures, of nine new species of *Crustacea* from the Mediterranean Sea. These are referrible to the genera *Portunus*, *Inachus*, *Alpheus* (2 species), *Callianassa*, *Praniza*, *Cymothoa* and *Caligus* (2 species). The localities in which they were found are Nice and the Bay of Naples.

The Memoir "Ueber die *Daphnia sima* und ihren Blutkreislauf," by Dr. Gruithuisen, is a valuable contribution to the anatomy of this singular genus. In young individuals of *Daphnia sima* the valves are so transparent as to allow of the circulation of the blood being traced through the entire body with little difficulty; and this circumstance has enabled the authour to give an outline of its course on the plate which accompanies his memoir. The following is the summary with which he concludes his more detailed account. "The veins descending from the arms, and ascending from the cheliferous tail and from the valves, pour the blood into the venous heart: the venous heart empties itself through a *foramen* into the arterial heart; from which the great mass of blood is sent upwards to the arms, to the head and to the mantle, and downwards to the tail, whence it returns by the veins, &c." Both the arterial and venous hearts are stated to consist of sac-like muscular membranes, capable of quick and powerful contraction, especially the former, in which the vivacity of the pulsations has been noticed by several writers. Only

those vessels which proceed from the heart appear, it is said, to possess proper coats, the capillary canals in which the blood becomes venous offering no trace of a proper vascular membrane. It may be added that the two systems seem, both from the description and figure, to pass immediately into each other.

We may also notice in this place, although properly belonging to another subdivision, the paper which follows by the same author, "Ueber die *Nais diaphana* und *Nais diastropa* mit dem Nerven-und Blut-system derselben." It forms an interesting addition to the little knowledge which we previously possessed respecting these minute and paradoxical *Annelida*. Dr. Gruithuisen states that he has never observed in the *Naidæ* any other mode of propagation than that by subdivision; and thus confirms the observations made by Trembley and Roesel, and if we recollect rightly by Müller also, that they are capable of artificial multiplication by cutting their bodies transversely into distinct portions, which had been doubted on the authority of Bosc and others. The nervous system is in *Nais diaphana* (which is synonymous with *Nais vermicularis*, Auct.) more developed than the apparently simple structure of its other organs would have led us to expect; in *Nais diastropa*, a new species, it is apparently much less complicated. The author assures us that the effect of this difference is strongly marked in the different degrees of sensibility and volition evinced by the two species. For the details of the nervous system, as well as of the vascular, we must refer to the paper itself.

The Dissertation "Ueber ein eigenthümliches, den *Nervus Sympathicus* analoges, Nervensystem der Eingeweide bei den Insecten," by Dr. Johannes Müller, contains a further development of the analogy between the *nervus recurrens* of insects and the *nervus sympatheticus* of higher animals. The anatomy of this, which he regards as the proper intestinal nervous system of insects, had already been given by the author from a species of *Phasma* in a previous volume of these Transactions. In the present it is extended to numerous other *Orthoptera*, as well as to insects of most of the remaining orders. From these observations Dr. Müller is clearly of opinion that the identity of the *nervus recurrens* with the ganglionic system, as it is called in *Vertebrata*, is clearly made out, and that there can be no doubt of its representing the *nervus sympatheticus*

and not the *nervus vagus* of the higher classes. The details, which are of great interest to the entomological anatomist, must be sought in the paper and its accompanying plates.

In the single Helminthological paper, "*Filiaræ et Monostomi* "speciem novam in *Balæna rostrata* repertam describit Dr. F. C. H. "Creplin." Of these two new species of internal parasites, the former, named by the authour *Filaria crassicauda*, was found in considerable numbers in the *corpora cavernosa penis* of the species of Whale indicated, and partially dependent into the cavity of the *urethra*. It appears to be the first *entozoon* discovered in such a situation in any animal. The other, *Monostomum plicatum*, Crepl., occurred on the inner surface of the small intestines, and of the *œsophagus*; it was also rather abundant.

The last paper in the present volume which, as zoologists, we have occasion to notice, gives the result of some "Untersuchungen über den "Bau einiger Polypen des Mittelländischen Meeres," by M. W. Rapp. The *Polypi* on which the observations in question were made were the *Veretillum Cynomorium*, Cuv., and *Tubularia solitaria*, Rapp, a species which the authour believes to be new. Much interesting information with regard to the habits of these singular creatures, and some new views with respect to portions of their anatomical structure, give value to this contribution. Both species are figured, and the large size of the aggregated polypes in the one case, and of the solitary individual in the other, affords an excellent opportunity for observing both their conformation and mode of life. They were observed by the authour on the coast of Languedoc.

British Oology, being Illustrations of the Eggs of British Birds, with figures of each species. By W. C. HEWITSON of Newcastle. 1831. Nos. 1. to 6.

Part of a very interesting, but hitherto much neglected, branch of Nature's productions is here illustrated in a manner highly creditable to the talents of the authour, who combines in himself the rare advantages of being an excellent artist as well as an ornithologist. Six numbers

of this valuable addition to the works devoted to the Natural History of our own country have appeared, containing 59 representations of the eggs of 40 species.

The outlines of the various forms are accurate, the markings characteristic, the shading and colouring delicate and true to nature, and several of the subjects already represented are of great rarity. Each number of this work, in addition to its four plates, contains several pages of letter-press descriptive of the situation of the nests, the materials of which they are composed, the number of eggs, &c. These and various other particulars, obtained in most instances by the personal observations of the authour, promise to add much to our knowledge on this very interesting and important part of the Natural History of our Native Birds.

W. Y.

ART. L. *Scientific Notices.*

Appendix to the Notice of the Herring.

The fishermen of Portree in the Isle of Sky told my friend Mr. Atkinson on his visit to St. Kilda during the summer of the past year that in one of the Lochs of Inverness-shire they formerly caught a species of herring twice the size of the common herring, and though this large sort were not numerous, they always took a few every season during their fishing.

The small transatlantic herring referred to, I learn from Mr. Ord, is called by the Americans the Nova Scotia herring, and is considered a better fish than the common herring of America, and a distinct species.

W. Y.

TO THE EDITOR OF THE ZOOLOGICAL JOURNAL.

Sir,

Finding in your last number for the current year, page 251, an allusion to my discovery of the Metamorphosis in the Decapodous Crustacea, by which I perceive that a degree of scepticism still exists, not only as to the facts upon which it is based, but also as to the universality of metamorphosis in this tribe of animals, I have now to state what will I trust convince you that if any *delusion exists or source of error*, it must rather attach to M. Rathke than to me; not having seen his work I judge only from the analysis with which you have favoured us in your interesting and valuable Journal.

First then, in regard to the Brachyura I have ascertained the newly hatched animal to be a Zoe in the following *Genera*, viz. 1. Cancer. 2. Carcinus. 3. Portunus. 4. Eryphia. 5. Gegarcinus. 6. Thelphusa? 7. Pinnotheres. 8. Inachus.

The Macrourous genera which I have actually ascertained to be likewise subject to metamorphosis, are 1. Pagurus. 2. Porcellana. 3. Galathea. 4. Crangon. 5. Palæmon. 6. Homarus. 7. Astacus! These embrace all our most familiar native genera of the Decapoda. With regard to Astacus however it will be necessary to be more particular. This genus embraces but two species, the *A. marinus* or Lobster, and the *A. fluviatilis* or River Crawfish; now with regard to the marine species or Lobster I can aver that it does actually undergo a metamorphosis, but less in degree than any other of the above enumerated genera, and consisting in a change from a cheliferous Schizopode to a Decapode; in its first stage being what I would call a modified Zoe with a frontal spine, spatulate tail, and wanting subabdominal fins, in short such an animal as would never be considered what it really is, were it not obtained by hatching the spawn of the Lobster.

Are we then to consider the fresh water species of Astacus or Craw-fish as an exception? or is there not reason (from the above detail) to suspect that this peculiarity may have escaped the notice of M. Rathke? If however it should be found otherwise, it can only be regarded as *one solitary* exception to the generality of metamorphosis, and will render

it necessary to consider these two animals for the future as the types of two distinct genera.

The accompanying rough sketch of the cheliferous member of the larva of the Lobster, [Tab. XV. f. 13] in which *a* is the claw, *b* the outer division of the limb or future flagrum, and *c* the rudimentary branchia, will enable naturalists that may have access to the work of Rathke, to institute such a comparison as may probably enable them to decide, whether there are any grounds for suspecting that a similar structure prevails in that of the River Crawfish.

I am, Sir,

Yours, &c.

Cork, Dec. 16, 1830.

JNO. V. THOMPSON.

Note on Procellaria Anjinho, Hein., and *Proc. Bulverii*, Selby and Jard.

Procellaria Anjinho described by the late Dr. Heineken in Brewster's Journal, and proposed with some doubt as a new species, proves, according to the remark of the Rev. L. Jenyns, to be altogether identical with the *Sooty Petrel* of Latham's Synopsis, the *Procellaria fuliginosa* of Gmelin and Latham's Index. *Procellaria Bulverii* of Selby and Jardine's Illustrations of Ornithology cannot be considered as differing from the same species in any thing but age. Young birds of *P. fuliginosa* have the plumage rather fuller and consequently appear rather larger; their tail is either perfectly even or has the middle feathers elongated. But if a large assortment of individuals be examined, several constantly occur upon which it is impossible to decide whether they belong to the latter or to the forked-tail sort, the transitions or variations in this character are so gradual and inconspicuous, and are moreover unaccompanied by any regular corresponding differences of size or plumage. In no other essential point does *Proc. Bulverii* appear to differ from *Proc. Anjinho*, and both must hereafter merge into synonyms of *Proc. fuliginosa*, Gmel.

Madera.

R. T. LOWE.

THE ZOOLOGICAL JOURNAL.

1832—1834.

ART. LI. *Remarks on the nature of the Respiratory Organs in certain littoral Mollusca of Madera.* By the Rev. R. T. LOWE, A. M.

IN reperusing, after a considerable interval, my paper in the 19th number of the Zoological Journal, (page 280,) in which I detailed a series of experiments, instituted with a view to ascertain something of the nature of the respiratory organs in *Melampus*, *Pedipes*, and *Truncatella*; it has struck me that I have been too hasty in regarding some of my conclusions as positively or finally established: or rather, perhaps, in not sufficiently explaining, or defining, the actual extent to which my resulting speculations might safely, and legitimately, be admitted.

It is very certain, from the fact of these *Mollusca* surviving total immersion for so long a period as they did, in water, that a remarkable difference in their powers, in respect to an ability for enduring complete deprivation of atmospherick air, from those of our land *Pulmonifera* in general, may be safely considered as established.* Now from this

* It is essential to remark that I do not consider this position invalidated by the following quotations from the observant Müller, or others of a similar character. Speaking of his *Helix pellucida* (*Vitrina*, Drap.) he observes, "Limacem in aqua perire affirmat Clariss. Geoffroi; hoc sese nobis, etiamsi periculum in pluribus fecerimus, minus probavit; in aquam enim immissi, fundum statim petierunt, ac totum corpus e testâ protulerunt; tentacula

difference of function or power in the animal, it seemed most natural and simple, at that time, to infer the probability of some corresponding

" tamen in aquâ, quod pluribus terrestrium commune, non exseruerunt; hoc
 " situ immobiles, mortuos quidem simulant; at *intra paucas horas* partim
 " aquâ exeunt, et observatori minus cauto perduntur; omnes vero, si ex
 " aquâ, immo post elapsum *duodecim horarum spatium*, tollantur, mox ten-
 "acula porrigunt, incedunt, ac brevi sese testâ condunt." *Mull. Verm. Hist.*
 p. 17.

Of his *Hel. obscura* (*Bulimus obscurus*, Drap.) he remarks, " Aquæ immer-
 "sus non perit, *sed ripam petit.*" Id., Ibid. p. 103. Speaking of *Hel. lubrica*
 (*Bulimus*, Drap.), he again professes to contravene Geoffroy's correct state-
 ment: " Aquis immersus non perit, licet Clariss. Geoffroi contrarium affirmat.
 " Primo quidem experimento limacem *periisse suspicabar; corpus enim extra*
 " *testam quasi exanimatum tentaculis in ipso corpore conditis hærebat*, dum mihi
 " simul in mentem venit effatum nominati auctoris de Cochleâ suâ VIII, eam
 " nempe in aquâ perire, atque hoc modo necari et e testâ elici; brevi tamen
 " sese vivum circumnavigando probavit. Cogebam enim in interiora testæ se
 " recipere, ac testam aquæ reddidi; confestim egrediebatur, et fato tranquillus
 " post intervallum *trium horarum* ripæ tandem appulit, ac sicco gavisus, ten-
 "acula promisit, et pro more incessit." Id., Ibid. pp. 104, 105.

At p. 99, he remarks of his *Hel. succinea* (*Succinea putris*, Auct.) " Auctores
 " hunc cognomine amphibium dixere, minùs vero accuratè: maximam enim
 " vitæ partem in sicco vivit, et in aquâ non perire pluribus commune est,
 " varietatemque *Hel. nemoralis in rivo* plures dies degere vidi." Id. Ibid. p. 99.
 Here he rightly considers the animal of which he speaks as terrestrial; but I
 make the quotation for the sake of the general remark, and the particular fact of
 the *Hel. nemoralis*; both again alluded to in the following passage of his Pre-
 face or Introduction.

" *Helicem succineam* auctores amphibium dixere, quum ei soli proprium in
 " aquâ æquè ac in terrâ vivere crederetur: at hoc pluribus terrestrium com-
 " mune est; multos enim aquæ immissos non suffocari, quosdam sese, ut au-
 " fugiant, aquæ sponte tradere; ideoque locum aquis clausum, quem cochle-
 " ariis instituendis Varro indicat, non satis tutum; varietatemque *H. nemora-*
 " *lis*, quod singularissimum puto, *fundo rivi* totâ æstate vivere, observationi-
 " bus didici." Id., Præf. " Testacea," p. xi.

The words are printed in Italicks which show the insufficiency of these obser-
 vations themselves to warrant the general conclusion he has drawn, " in aquâ
 " non perire pluribus commune est," at p. 99, and again in the last quotation

variation in the form, structure, or nature of the breathing organs themselves; instead of looking for such difference elsewhere. And reasoning analogically from the fact, that various branchiferous animals not only of the *Mollusca*, but of much higher orders, such as *Crustacea*, various *Fishes*, &c., survive, as long as their *branchiæ* only are kept moist, a total deprivation of the fluid in which they habitually live immersed: while, on the other hand, no well-established instances seemed recorded, of an animal, with respiratory organs formed originally to derive oxygen immediately from the atmospherick air, having the power of accommodating the same organs to the extraction of this vital principle from water†: it seemed more reasonable to consider, on the ground of my experiments, the above mentioned *Mollusca* to belong to the former of these classes, than to regard them as indicating the existence of a new group of animals possessed of the latter anomalous, and altogether unexampled, characteristick.

I am, however, perfectly aware of the danger in natural science of carrying too far the argument from analogy, or of indulging too freely in processes of generalization. I am sensible too of a deficiency in the chain of facts; and one that in most other countries I might have myself very easily supplied. I wish therefore at once to notice and account for its omission. The point is this: my experiments prove indeed, that

from the Preface. As to the observation on *Hel. nemoralis* recorded in these two last quotations, not to dwell upon the discrepancy or inaccuracy in the accounts themselves of “*plures dies*” and “*totâ æstate*,” (for it can scarcely be doubted that both statements refer to one and the same fact), no reliance can be placed in a matter of such nicety on an observation which leaves it doubtful whether an animal “*in fundo rivi*” or “*in rivo*,” might not have frequent opportunities of obtaining a supply of atmospherick air, though not actually seen by Müller himself in the act of doing so.

* See *inter alia*, Mull. Verm. pp. 153, 160.

† The converse of this, it is well known, is in some sense exemplified in the *Batrachia* (amongst others); in the passage of the common *Frog* from the *Tadpole* to the perfect state. But, in this case, it is not by the accommodation or modification of the old organ, but by the use of a distinct, coexistent, hitherto unemployed one, that the animal at last breathes air, instead of water.

while our land *Pulmonifera* cannot long survive a total immersion in water, certain amphibious littoral *Mollusca*, the nature of whose respiratory organs is in question, can do so: and hence that the powers of these animals are certainly, those of the breathing organs are probably, and therefore the structure of the latter also probably, dissimilar. But it is not allowable to infer from this, with anything more than conjectural force, that the breathing organs of the latter are in structure so different from those of the land *Mollusca*, as is involved in the supposition that they are pectinated, till I have also proved, by similarly conducted experiments, that the fluviatile *Pulmonifera* will, no more than those of the land, survive a total immersion, for an equal length of time with my *Pedipedes* and *Truncatellæ*, in the fluid they inhabit. And even then, that they are precisely so different as to be actually pectinated, will perhaps after all require little short of anatomical demonstration: for it is possible, that this difference of power may be the result of some difference of organization, or of some apparatus of compensation, existing elsewhere than in the respiratory organs; analogous to that which the *Seal* possesses in the large venous sinus of the liver; or to that which the fœtus exhibits in the *foramen ovale*, among *Mammalia*: the breathing organs themselves remaining the same. The question as to the fluviatile *Pulmonifera*, however, is a point most easily determined* by any one who can procure live *Limnææ* or *Physæ*, &c.; whilst here it is impracticable, or at least difficult, there being only one or perhaps two minute new species of *Limnæa*, and those of extreme rarity, besides *Ancylus fluviatilis*, in the island. I must therefore content myself with commending this simple experiment to some of my conchological friends at home, which will serve as a very fair sort of *experimentum crucis* to my former trials in Madera. If the result satisfactorily determine the

* Müller at p. 128 of the *Hist. Verm.* has an observation on his *Buccinum auricula* (*Limnæa auricularia*, Auct. rec.) much in point, tending as far as it goes to confirm what I cannot help suspecting may prove to be the fact; namely that these fluviatile *Pulmonifera* will really be found capable of supporting life when totally immersed. But still, like his other experiments, it is too deficient in detail and precision to establish the matter in question.

inconclusiveness of those experiments for proving the respiratory organs of *Melampus*, *Pedipes*, &c. to be pectinated, by showing that the animals of *Limnæa*, with respiratory organs well known not to be so, are equally capable of supporting life under similar circumstances, it will establish at least the fact, that a class of animals exists, which, with respiratory organs originally formed for breathing atmospherick air, have yet the power either of accommodating these very same organs, (not of developing or employing different ones, as certain *Reptilia* do in the converse case*), to the abstraction of oxygen from water, or also, perhaps, even of supporting life solely by the action of the water on the integuments or mantle : by, in short, a sort of conversion of the whole exposed surface of the body into a breathing apparatus, without employing the aerial breathing organs at all. It must indeed be admitted, that in animals like these, in which the influence of oxygen on the blood is tending fast to its minimum, it is not difficult to imagine that the system of the animal functions may with much greater theoretical plausibility be conceived capable of accommodating itself to such a change, than in higher races of animals and types of organization : in which the oxygenous fluid exercises a much more powerful influence, and plays a far more important part in the conditions of vitality.

The solution of this problem is equally interesting in a geological point of view as in others. It will tend to demonstrate the right or wrong collocation of many fossil shells; a question of so much consequence in the discrimination of various strata. It will go to prove whether certain genera which have been heretofore referred to the land or fresh-water *Pulmonifera* do or do not belong to the marine or at least littoral *Pectinibranchiata*. I am therefore proportionately interested in its right determination ; and no farther anxious for the verification of my former inferences, than as far as regards the establishment of the truth. They will stand, at all events, as useful starting points for the researches of others : and the conclusions there drawn (some of them certainly too positively) will also, if proved erroneous, serve to display the necessity of extreme caution in all inductive reasoning to Naturalists in general.

* See Note †, page 387.

My object in these additional remarks is not at present entirely to renounce all my former inferences; but only to guard other enquirers, by explaining more clearly and distinctly the exact extent, to which, in the present state of the matter, those conclusions may be safely and legitimately received.

I have been led to reconsider and thus to recapitulate this matter, from some anatomical observations, made by my friend the Reverend M. J. Berkeley, on the nature, or structure, of the respiratory organs in *Voluta denticulata*, Mont. These he is inclined to consider of the same nature as those of the *Limnæidæ*. I am not in any way disposed to impugn the correctness of these observations; nor to shelter myself behind considerations of the difficulty of obtaining by the scalpel correct ideas in objects so minute and difficult of examination as these. To the authour of the investigation of the anatomy of *Cyclostoma*, in this Journal, apart from all private sources of the fullest confidence in his skill and ability, the most implicit dependence may be paid, in points such as these; however baffling they may have proved to the researches of myself and others, conducted on the same plan. But granting the complete establishment of the fact, by any means of investigation, viz. that the respiratory organs of *Vol. denticulata*, Mont. are not branchial, i. e. pectinated; I am not therefore authorized to conclude finally, though I may be led to suspect, that those of *Pedipes*, *Truncatella* and *Melampus* are also not so. In my former paper, I have myself introduced this shell, not without considerable hesitation on other grounds, into association with my *Melampodes*, in the absence of all accurate knowledge of the animal as to the point in question. I cannot therefore at present admit this instance to be of sufficient weight to invalidate peremptorily all the inferences in question; though it is certainly well worth consideration, and a most interesting discovery in itself.

R. T. L.

Madera, March 20th, 1833.

ART. LII. *Description of a new Genus of Reptilia of the family of Amphisbænidae.* By THOMAS BELL, Esq., F. R. S. L. S., &c.

Fam. AMPHISBÆNIDÆ. (*Amphisbænoidea, Fitzinger.*)

Genus ANOPS, nobis.

CHAR. GEN. *Pedes nulli. Annuli thoracici completi. Rostrum porrectum, scutello arcuato, compresso tectum. Oculi sub scutellis latentes. Linea lateralis depressa. Cauda breviuscula, obtusa. Pori præ-anales nulli.*

ANOPS KINGII.

Corpore suprâ fusco, infrâ albido.

TAB. xvi, fig. 1.

Habitat in Americâ Australi.

Exstat in Museo nostro.

THIS interesting little animal forms one of the numerous additions made, by the indefatigable researches of Capt. King, to the Natural History of that part of South America, which formed the subject of his late important survey.

As in the rest of the *Amphisbænidae*, the body is long, slender, and cylindrical; becoming however rather smaller towards the tail, which terminates obtusely. The scales, which are arranged in complete rings around the body, are all quadrangular, and generally equilateral, excepting those near the lateral line, and on the tail, which are longer than they are broad. The lateral line is slightly depressed, forming a small channel, more distinct than in *Amphisbæna*, though less so than in *Chirotes*, and extending nearly the whole length of the body on each side. There is not, externally, any appearance either of anterior or of posterior members. The head is covered laterally with about eight or nine pairs of small flat scutella, and is protected above and in front, by a single one, which is arched and compressed so as to form a sharp edge, and projects considerably beyond the lower jaw. The eyes are so completely hidden under a pair of the small plates which cover the sides of

the head, that their existence is only indicated by a slight shade of colour seen through the horny plate. The ears, as in the other genera of the family, are entirely hidden. The anus is transverse, and forms the segment of a circle; the anterior border being furnished with three pairs of plates, of which the outer pair is rounded, the others quadrangular; while the posterior edge has four pairs, the middle pair of which are large and square, the others narrow and somewhat fan-shaped. There are no pores anterior to the anus, as in *Amphisbæna*.

	In.	Lin.
Total length	8	5
Length of the head		4
———— the tail	1	2
Diameter of the body		4

The propriety of applying a distinct generic appellation to this new species of a singular and interesting family, will, I think, appear from the consideration of the characters which I have given in the foregoing description. Whilst the general form, the structure and arrangement of the scales, the concealed ears and eyes, and the short obtuse tail, point out at once its close relation to the other genera of the *Amphisbænida*, there are several characters, and those not unimportant, in which it differs from all the genera at present included in that family. Thus by the absence of any external rudiments of members, and the entire concealment of the eyes, it is distinguished from *Chirotes*, to which it is allied by the depressed lateral line, and by the absence of præ-anal pores. From *Amphisbæna* it differs in the absence of pores and in the more depressed lateral line; and it wants the broadly shielded thorax of *Le-posternon*. From all it is strikingly different in the form of the rostrum and of the singular compressed frontal plate, which considerably resembles that which characterizes the genus *Typhlops*.

Whether we may consider this peculiarity as constituting an approximation to the last named genus, it would perhaps be presumptuous to decide; but the same peculiar structure would indicate a corresponding similarity in their habits; and I cannot doubt that the hard sharpened and prominent horn which terminates this part, is intended to facilitate the entrance of the animal into masses of closely entangled herbage and

brushwood, or even under the surface of the ground, where it would force a passage in the pursuit of insects and worms, on which all these animals probably feed.

The arrangement of the scales in the *Amphisbænidæ* generally, is calculated to afford in an equal degree the power of progression and retrogression; as they are in no case imbricated, but placed side by side, with the posterior as well as the anterior and lateral margins closely connected with the skin. They are the only *Reptilia* which can with strict propriety be termed *double marcheurs*.

ART. LIII. *Description of a new Genus of Reptilia of the family Scincidæ.* By THOMAS BELL, Esq., F. R. & L. S., &c.

Fam. SCINCIDÆ (Scincoidea, Fitzinger.)

Genus LERISTA.

CHAR. GEN. *Caput* scutatum. *Palpebræ* nullæ. *Aures* sub cute latentes. *Corpus* gracile; *squamæ* læves, æquales. *Pedes* quatuor; *anteriores* exigui, brevissimi, didactyli; *posteriores* longiores, tridactyli. *Anus* simplex, semicircularis. *Pori præanales* et *femorales* nulli.

LERISTA LINEATA.

Æneo-viridescens, subtus pallidior; lineis binis dorsalibus, et binis lateralibus, nigris.

TAB. xvi, fig. 2.

Habitat in Australiâ.

Mus. nost.

THE specimen on which I have thought it necessary to found this genus, was presented to me by my friend John Dalrymple, Esq., with

several other new species of *Reptilia*, which he had received from the Swan River.

The head of this little animal is rather pointed, the upper jaw projecting a little beyond the under; the teeth are minute, simple, and numerous; the nostrils nearly round; the eyes, covered by a transparent cuticular plate, are destitute of eyelids, and surrounded by a circle of minute scales; the ears, as in the *Anguidæ*, are wholly concealed by the scaly integument. The body is slender, continuous from the head, and of nearly the same size to the commencement of the tail; it is covered by semicircular scales, which are perfectly smooth, and have entire margins. The fore legs are very distant from the hinder, extremely small, and furnished with but two minute toes, of which the inner is the longer; the hinder legs are about twice the length of the anterior, and have three toes, of which the outer is the longest, and the inner the shortest. The tail is as long as the head and body, slender and tapering. The anus is simple and protected by two large polished scales. There are neither femoral nor præ-anal pores. The general colour is a light metallic green, paler beneath; the head is spotted with blackish brown, and there are a pair of narrow black dorsal lines extending from the neck to the end of the tail, and a pair of broader lateral ones, of the same colour.

	In.	Lin.
Total length	3	8
Length of the head		3
———— body	1	6
———— tail	1	9
———— fore foot		2
———— hinder foot . . .		4
Diameter of the body . . .		2

The foregoing description will at once shew that whilst this little animal agrees with the rest of the family of *Scincidæ* in all its general characters of form and structure, and in the arrangement of its scales, it possesses some very interesting peculiarities which at once distinguish it from every other genus. It agrees with the genera *Gymnophthalmus* (Merrem), and *Ablepharis* (Fitzinger) in the absence of eyelids; but it differs from both of these in the number of toes; the former having 4—5, the

latter 5—5, whilst *Lerista* has 2—3. This trivial distinction, had it stood alone, would scarcely have warranted me in giving to this animal a new generic name, but would rather have called for a revision of the characters of the two genera above named. The absence of external ears, however, constitutes a character of no inconsiderable importance, and, when combined with those above mentioned, and with the more elongated and auguiform structure of the body, bears me out in considering it as a distinct genus.

Its affinity to Mr. Gray's genus *Saiphos* is probably very close, as it agrees with it in the concealment of the ears by the integument, and in the absence of femoral pores, and approaches it in the comparatively elongated body and small limbs. From this genus however it differs not only in the number of the toes, but in the absence of eyelids.

I have thought it necessary to enter into this rather lengthened detail of the affinities and distinctions of this animal as compared with its congeners, not only to shew its actual relation to them, but also to exonerate me from the charge of needlessly multiplying genera; a fault which attaches to the Naturalists of the present day, almost as strongly as the contrary error formerly did to the strict Linnæans. It has always appeared to me, that a legitimate reason for the construction of a generic character, and a fair claim to generic rank, exist, when we find such a peculiarity of structure as evinces any marked difference in the habits of the animal, from those most nearly related to it; and such I believe to be the case in the structure of the organs of hearing and of vision in the genus *Lerista*.

ART. LIV. *On the Food and Habits of certain Insects.*

By T. BRIGHTWELL, Esq., F. L. S.

Sustentatio larvarum, imprimis rapinâ viventium, sæpius singularis.

FABRICIUS.

I. REAUMUR has investigated and described the metamorphoses of the *Corethra plumicornis*,* a little Gnat of the family of the *Tipulidæ*, but this distinguished Naturalist was unable to determine the food of the larvæ; he conjectured that they devoured the invisible *animalcula*, teeming around them in the stagnant waters which they inhabit.

Reaumur found the larva in July and August in water. He describes its body as transparent, almost cylindrical, largest at its anterior part; the head has in front a double hook (*crochet*). In the anterior part are two reniform little bodies, and two others of the same kind, but smaller, towards the anus. The last segment of the body has underneath an oval fin (*nageoire*) in the form of a leaf, and the anus is furnished with two fleshy horns. The nymph is furnished with two little horns on the head and two elliptical *nageoires* at the anus. It remains in this state only ten or twelve days. To this may be added that the viscera appear to consist of a simple alimentary canal, largest in the centre of the body where the food remains during digestion. The body of the animal consists of innumerable crystalline fibres, woven together like net work. It is more rigid than its appearance seems to indicate, and it retains this rigidity to a remarkable degré after death.

Accident made me acquainted, a few years since, with the fact that these little animals devour, with astonishing rapacity, the *Water Flea* (*Monoculus Pulex*, Linn., *Daphnia Pulex*, Müller) and that they are an instrument, in the hand of Providence, for preventing their excessive

* *Corethra culiciformis*, De Geer, VI. 372. t. XXIII. f. 4—12. *Cor. plumicornis*, Reaumur, Vol. V. 40, Tab. VI. f. 4—15. *Tipula chrystallina*, De Geer, 149. 20? It is doubtful whether it be De Geer's insect: the respiratory horn is wanting in our species. *Cor. plumicornis*, Meigen, Dipt. Eur. Vol. I. 15. 1. *Corethra lateralis*, Latr. and Panz.

increase, an increase which has been sometimes so great in stagnant waters, as to change them into the appearance of blood, and make them like a thick mass of living water.

The *Daphniæ* are about the size of a pin's head, and half a dozen *Tipulidan larvæ* will clear a bottle well stocked with them in a few hours. They seize their prey with the rapacity of a *Pike*, grasping it with the two anterior jaws or hooks (as Reaumur calls them) and gorging it alive. The larger *Daphniæ*, filled with ova, often struggle a long time in the jaws of their adversary, who can only swallow them by degrees. These *larvæ* will live several days without food, but die after that time, although the water be daily changed. Once, being unable to procure any *Daphniæ*, I cut some roasted mutton into small particles, and on putting a few into the bottle in which I kept the *larvæ*, most of them struck at, and two actually gorged, this substantial diet. One of these I kept for some days in a small glass tube, watching it carefully until the mutton had digested. From the transparency of the animal this process might distinctly be perceived; the food dissolving into an opaque fluid, was gradually absorbed by the surrounding vessels, until the body was tinged with a greenish color. This animal continued in a highly vigorous state for two days without any other food, when it changed first into the *nympha* state, then into a fine specimen of the perfect insect.

A bad figure of this *larva* is given by Reaumur; we have given a more accurate one, Plate XIX., fig. 1, in which *a.* is the animal of the natural size and *b.* highly magnified. In the latter the parts as described by Reaumur will be readily traced.

II. Most Naturalists are aware of the fact that intestinal worms are found in the bodies of various insects, and particularly in those of several species of the *Carabidæ* inhabiting moist situations. I have found them most abundantly in the bodies of the *Harpalus* or *Molops madidus*, a very common insect of this family. These worms, which are identical with, or allied to, the *Gordius aquaticus*, Linn. (*Filaria* of modern authors), are a most formidable foe to these insects, devouring the

whole of their viscera and ultimately destroying their victim. The abdomen of the beetles thus infested often presents so swollen an appearance, that a diligent observer may readily recognize them. Two, or even three of these worms, from one to three inches long each, are occasionally found in the body of one insect, and when developed, it appears almost impossible that they could be coiled in so small a space as that from which they have emerged.

I have kept many of the worms taken from the *Carabidæ* in water, but they have uniformly died after some weeks, having during that time maintained a constant vibratory motion. After a tempestuous torrent of rain, which fell on a hot day in the latter end of July, my children brought me two of these worms, found in my garden upon the dripping leaves of an *Arbutus* tree. One of them was about two, the other about three inches long. They were both in a very vigorous state, and I immediately placed them upon some wet earth, in a garden-pot, with a glass over them and proceeded to search for a specimen of the *Molops madidus* that I might introduce it to the *Gordii* and see what would follow. Having speedily found one of these insects I put it under the glass, and in less than five minutes the beetle attacked one of the worms, cut it in pieces with its jaws, and very quickly devoured it, pushing with its palpi the wriggling pieces of worm into its mouth. The *Molops* entirely devoured both the worms in about ten minutes. I kept this *Molops*, feeding it with flies and other insects for some days, when it died. On dissecting it I could not discover any traces of the worms it had devoured.

About the same time another worm of this kind was found, after a heavy rain, in the garden of a friend, which was presented to me. This worm is of an amber colour and transparent, and when examined under the microscope its annulose structure is very distinct, the whole body being transversely striated. The intestinal canal appears filled with little well defined globular bodies of a dark colour, presenting the appearance of ova. This worm tapers towards the head, which is slightly tinged with a crimson hue; the orifice of the mouth can under a lens be distinctly perceived. The ova (if such they are) commence where the tapering off to the mouth ceases, and are continued to the anus, which

is blunter than the head, and of the same colour as the rest of the body. The oviform bodies lie in conglomerated little masses in the middle part of the canal, but in the other parts assume nearly the form of a string of beads. On subjecting a small section of this to a high power in a compound microscope, the little globules appeared depressed in the centre, and darkest on one side.

It is natural to enquire how these worms find access to the bodies of insects coated in mail of such proof as the *Carabidæ* are encased in. It seems evident they cannot enter by the mouth, as the *Carabidæ* greedily cut up and devour them. Do they not (after the manner of the *Gordius Medinensis*) penetrate and lodge themselves in the bodies of the *Carabidæ* upon their first emerging from the *pupa* into the *imago* state? At this time we know the bodies of the *Carabidæ* are so soft as to be easily penetrated, and that they remain some time in this state concealed in situations where these worms are not unlikely to be found.

Mr. Jeffreys, in his valuable Synopsis of the *Testaceous Pneumonobranchous Mollusca* of Great Britain, in the last part of the "Transactions of the Linnean Society," has stated some facts, which appear to render this opinion probable, and the same Naturalist has also suspected that the *Gordii* are the food of the insectivorous *Water Beetles*. He says, "All the inhabitants of this genus (*Limneus*) may be truly termed amphibious, since the nature of their food frequently obliges them to seek it on wet and marshy ground. During the spring they are greatly infested by a minute slender species of *Gordius* which, in number from two to ten, attach themselves to the interior of the mantle near its connection with the neck of the animal. This troublesome parasite does not seem to be stationary, since I have not unfrequently observed it to change its place and take up perhaps more commodious quarters in another shell. It probably constitutes part of the food of the smaller *Dytiscidæ*. After I had put two sorts (the *Dyt. trifidus* and *Dyt. crassicornis*) into the glass vessel where the *Limnei* were kept I could not detect any signs of the *Gordii*: though in other cases I have known them to survive, even after their guardians had begun to putrify."

ART. LV. *On the Spiders of the Genus Dysdera, Latr. with the Description of a new allied Genus.* By ROBERT TEMPLETON, Esq. *In a Letter to the Editor.*

SIR,

MY attention having been directed for some months past to the *Spiders* in my immediate neighbourhood, an attentive examination of their generic characters became necessary. The following paper, which is the result of my enquiries so far as relates to the genus *Dysdera* of Latreille and an allied one, of which at present I have met with only one species, will I hope prove not devoid of interest to your readers.

I am, &c.

ROBT. TEMPLETON,

Corr. Memb. Belfast Natural History Society.

To N. A. VIGORS, Esq.

ARANEADÆ, Leach.

DYSDERA*, Latr., Walcken., Leach.

Eyes 6, arranged in the circumference of a circle, the anterior largest.

Div. 1. DYSDERA.

Mandibles † porrect, about half the length of the thorax, internally truncated obliquely from a little beyond the base, posterior edge sur-

* That there exists a necessity for an attentive examination of the various genera of the true *Araneidæ*, and indeed I might say of the *Arachnida* generally, will be at once recognized when I state that I have a considerable number of *Spiders* that will go into no genus as at present established, and that the genus *Epëira*, as the characters are given in that deservedly popular work, Samouelle's "Entomologist's Useful Companion," will not admit the typical species *Ep. Diadema* with *quadrata*, *alsine*, and a host of others.

† In examining the jaws of *Spiders* the various parts must be detached from the head of the animal, since from the transparency and minuteness of different parts, their exact form cannot be determined; besides the errors likely to arise

mounted by a row of teeth (4 in number), a cavity towards the apex to receive the claw which is very long and strong.

Maxillæ anteriorly triangular, contracted in the middle and very much dilated posteriorly where the palpi are attached; labial edge nearly straight.

Lip elongate, gradually narrowing to the apex, which is truncated and grooved, the sides posteriorly slightly curved out to receive the maxillæ.

Palpus with the 2nd joint much curved, the last short in the male, and with the fecundating appendage oval.

Eyes, the anterior distant, so as to give the appearance of a horseshoe, and not much larger than the other pairs.

Legs, the 4th pair longest.

Dysdera erythrina, Auct.

Dysdera ? parvula, Dufour.

Div. 2. HARPACTES.

Mandibles somewhat vertical, small, elongate, abruptly truncated at the apical extremity, with 2 or 3 minute teeth; the claw very short.

Maxillæ elongate; the sides parallel, rounded at the extremity, truncated obliquely internally, a little dilated externally to receive the palpi.

Lip elongate, rectangular, slightly contracted at the apex and dilated at the base.

Palpus with the 2nd joint not much curved, the last moderately long, and the fecundating organ somewhat cylindric.

from want of sufficient light and the foreshortening. If the drawing of the jaws of the last species described in this paper which was taken with the parts in situ, were placed side by side with the correct representation in the accompanying drawing, no one could conceive that they belonged to the same species. I am inclined to think that Walckenaer's division *Triangularilabæ* of the genus *Theridium*, has been formed by a mistake of this kind, the triangular anterior lip being plainly seen and the minute fine line which marks the edge of the posterior being not at all discernible, unless after dissection, in a great many species.

Eyes, the anterior pair approximate, leaving no open space, and much larger than the other pairs.

Dysdera Latreillii ?, Blackw.

Dysdera ———, mihi.

Being by no means an advocate for the unnecessary establishment of new genera, I have merely removed these Spiders into separate divisions, the differences being too striking to admit of their being associated together, though in habit and form they bear a strong analogy. As I am not certain that my species is that described by Dufour or by Blackwall I am undetermined as to which division their specimens may belong. I have however given a drawing and description of mine, so that those who may have opportunities of meeting with the *Dysd. parvula* of Dufour and the *Dysd. Latreillii* of Mr. Blackwall may be enabled to combine the synonyms, if they all belong to the same species. Dufour's description is "Thorax smooth, depressed, livid black; mandibles, palpi" and feet testaceous rufous; abdomen griseous, hispid," which might apply to mine; but in his drawing the mandibles are represented of half the length of the thorax, and the eyes differ from mine slightly in position and magnitude: how far these differences may have arisen from hasty examination I am unable to determine, but if the drawing be correct, it unquestionably refers to another species.

In the examination of Spiders a source of inaccuracy arises, which requires to be pointed out, and which has perhaps led to the slight difference between Mr. Blackwall's description and that given below. If the Spider be examined in the air, the silky hairs lie over each other so as to prevent the abdominal maculæ being at all or clearly distinguishable, and to obviate this, I have uniformly placed the species I sketch under water between two plates of glass separated by rings of card, thus each hair assumes its natural position and the maculæ are easily seen.

Dysdera Templetoni *.

Dysdera Latreillii ?, Blackw.

* Mr. Templeton having omitted to affix a trivial name to this species, the Editor has supplied the deficiency by applying to it that of its able observer.

Female.

Cephalothorax oval, broadest posteriorly, 6-angular, the angles well marked; castaneous black, shining, eyes silvery white occupying the middle third of the forehead: beneath pale slaty brown becoming darker at the roots of the coxæ.

Abdomen cylindrical, widest a little behind the middle, one-half longer than the thorax, pale brown with innumerable dark brown maculæ scattered over the whole excepting the upper third of the middle line and a narrow crescentic portion along the apex; spinnerets not projecting: beneath the lateral portions covered with maculæ, which not encroaching on the middle third leave a pale yellowish brown space extending from the spiracles to the spinnerets; with close attention we may on this space in some specimens observe obsolete maculæ towards the anterior part.

Palpi pale greenish brown, the last joint darker.

Legs nearly of equal length, the 3d pair being a little shorter than the rest, very pale brown. The femur with a diffused green annulus; the 2d joint of the tibia with the basal half greenish brown; legs densely covered with fine hairs, and the last joint of the tibia and the 1st of the tarsus with fine black spines; claws black.

Male.

The male differs in having the abdomen grayish yellow with scattered dark hairs, more copious at the sides and posteriorly, the maculæ with a light centre, not found at the anterior part, and so arranged as to leave a fine, pale, unoccupied medial line: beneath it has on each side three large dark maculæ in a row, parallel to that of the opposite side.

Legs yellow, with the base of all the joints and the femur brown.

Spinnerets projecting.

This little Spider, which I have been acquainted with for two or three years, runs with great rapidity, and may be procured in considerable abundance by separating the close ivy from fir trees, and striking it suddenly on a table on which a large sheet of paper or a napkin is placed: the little animals are then forcibly detached from the minute recesses in

which they secrete themselves and can easily be picked up with a moistened camel's hair pencil. They are best killed and preserved by immersing them in spirits.

OONOPS.

Mandibles elongate, truncated obliquely, forming a groove to receive the claw ; no teeth ; claw short.

Maxillæ approaching, elongate, narrowed at the apex and obliquely truncated internally ; base slightly dilated to receive the palpi.

Lip elongate subtriangular, rounded at the apex.

Palpus in the female gradually enlarging to the last joint which is conical, and surmounted by a minute conical joint ; hairy, all the hairs serrated. In the male, the last joint short, and the fecundating appendage pyriform with a long bristle terminating it.

Eyes oval, the larger pair placed side by side, touching nearly their whole length ; the lateral pairs placed obliquely on their outer side.

Legs 4th pair longest.

Oonops pulcher.

Cephalothorax triangular, oval, pale reddish brown, pinkish, or occasionally pale greenish brown, translucent, smooth ; eyes bluish, surrounded by black elevated rings ; in the greater number of specimens 3 rows of scattered strong black hairs pass down the back, one in the middle line and one on each side of it, these end about two thirds of the way down by diverging irregularly towards the legs : beneath pale pinkish, very thickly covered with black hair : hook of the mandible castaneous, jaws covered with scattered black hairs.

Abdomen oval, broadest a little behind the middle, anteriorly mounting upon the corselet, coccineous, covered with strong black, or occasional pale, hairs, particularly anteriorly : beneath concolorous, with often a dark fascia running from the stigmata to the spinnerets ; spinnerets rather long, projecting a little beyond the apex of the abdomen.

Legs vitreous, densely covered with fine hairs ; the last joint of the

tibia and 1st of the tarsus with a double row of strong and lengthy spines; the posterior legs with a few additional, smaller, irregularly placed.

This beautiful little Spider, which is with me exceedingly common, is to be found in the same situations as the last: it passes the winter in the centre of little cocoons which it weaves in the interstices of the ivy. When first detached from the cocoons they are a little stupid, but soon recover and begin to run about. They seem in their movements to combine the peculiarities of different families of *Spiders*, at one time running forwards, then, when interrupted in their progress, taking a little jump to the right or left with inconceivable swiftness and starting off in some other direction. I have never seen them catching their prey by leaping on it, but have no doubt of their capability, if the destined fly be properly situated to admit of it, and I am inclined to think that this is their mode of seizure, as they do not seem inclined to weave nets; a few irregular threads being the only product of their labour when I have confined them.

They seem to possess a power which, from Mr. Blackwall's observations, must be very rare among *Spiders*; I allude to their being enabled to walk upon glass. I have taken every precaution in ascertaining this, so as to avoid every doubt which could arise. I took them up on the point of a brush and placed them on a plate of glass and then set them off running in an opposite direction to that by which I placed them there, so that no previously formed thread could assist them. I also applied a high magnifier, and though the glass plate was held towards opaque and luminous objects and with the light falling in every possible direction, I could detect no thread; I observed however that the whole of the last joint of the tarsus was closely adpressed to the glass, and that it walked with great deliberation; when disturbed immediately forming a thread as it dropped. How they manage this I cannot say, as they have no provision such as we find on the feet of flies to enable them to effect it. The claws are figured in the drawing, and between them I detected on one foot a little transparent body on a peduncle exactly like what we observe on the feet of the genus *Ciro*. Perhaps this may be the part of the foot in which the power resides. It requires future investigation.

The necessity of separating this genus from the preceding, to which it is very closely allied, can admit of no doubt. In the first place, its form is exceedingly dissimilar, as will be apparent from a comparison of their profiles, that of *Dysdera* being very elongate and cylindric, this short and globose as in *Theridion* or *Epëira*, and the peduncle very far along its inferior surface. The cephalothorax is also in this nearly rhomboidal, the opposite sides being very nearly parallel, and the angle by which the anterior recedes being very acute, while *Dysdera* is far from presenting such a form, and the anterior superior angle is nearly a right one. The eyes here also differ from those of every other genus, the large ones in the centre and the lateral pairs being all oval*: not however perfectly regular, the inner edges of the larger being nearly straight and their breadth being diminished disproportionately anteriorly; the lateral ones are much more nearly perfectly oval but they differ slightly anteriorly. In the palpi the greatest discrepancy occurs, and I know of no other genus in which the hairs are serrated. The parts of the mouth are also unlike *Dysdera*.

When the Spider is examined alive its blood † is perfectly transparent,

* Though these eyes assume this singular form, to suit perhaps the œconomy of the animal, it is obvious that the surface must be part of the same solid of revolution, else distinct vision would not be practicable: this is a curious circumstance, and leads to the enquiry of how the surface becomes modified in the compound eyes of *Lamia*, *Saperda*, &c.

† I know no more beautiful and interesting object, than the circulation of the blood in the Spider presents under the microscope. It is much more distinctly seen in *Clubiona atrox* than in any other species I have yet examined, from the circumstance that the particles or globules of the blood are very opaque and therefore more distinctly observable. To see the motion in the legs the age of the specimen matters not, but if the entire circulation be the subject of investigation it is better to take the young, the central dorsal macula alone being then distinctly marked. The mode I pursue, and which I recommend for the adoption of others, consists in placing the Spider under water between two plates of glass with a ring or two of card interposed of sufficient thickness to prevent its being much compressed: the animal is thus prevented from struggling, and as sufficient air remains in and about the pulmonary sacs to afford an adequate supply of oxygen to it, it does not seem to suffer from the confinement in water. By throwing the light of the reflector up, the circulation of

no dark globules occurring as in most others.

the blood is now distinctly perceptible. The heart, as was long ago pointed out, occupies the superior anterior portion of the abdomen, the blood passing in laterally at the posterior part; it contracts 53 or 54 times in a minute, the muscular apparatus dragging it forwards and compressing it at the same time. When it expands some of the blood seems to regurgitate, but the greater mass is driven forwards through a small vessel into the cephalothorax. This vessel enlarges and presents every appearance of an auxiliary heart, as attached to it on each side is a cartilaginous clavicle-shaped body which is fixed anteriorly and moved by lateral muscles posteriorly, and which separating and again approximating drive forward the fluid. These cartilages are considerably separated anteriorly, but the posterior extremity is merely separated by the vessel, and is parallel to its fellow of the opposite side. The vessel in passing forward from the thoracic heart? immediately divides, a branch passing to each side of the vomeriform process of the skeleton which is found beneath the central thoracic point, and which gives attachment to certain muscles of the coxæ; it then reaches to a point about midway to the apex of the cephalothorax and divides into a lash of branches, one of which joins its fellow of the opposite side and runs down the centre of the forehead, its course being marked by a groove on the skeleton internally, giving branches to the eyes; another branch goes down the centre of the mandible or rather nearer to its outer side; and one to each of the legs, palpus, jaw, &c.: that going to the posterior legs runs nearly directly backwards. In tracing it down the leg we find it nearly in the middle line; it terminates a little from the claw by opening directly and at right angles into the vein which is of much larger size and generally lies on one side of the artery in the tarsus, getting under it however at the joints; the vein being larger, and subdividing and again joining, the blood moves in it much slower than in the artery and apparently often stagnates until the vis a tergo produced by the accumulation behind drives it on. If analogy be of much importance, this settles the physiological discussion relative to an active power in the capillaries, none being here at all distinguishable. The blood from the several parts, viz. legs, mandibles, &c. collects in a lateral thoracic vein, the openings being at right angles. This vein then passes into the abdomen at the sides of the pedicle, a curious valvular structure, which I first saw last May in *Lycosa saccata*, being placed here; it is fixed in the middle line and has its outward extremity free, being of a crescentic form, and past it the current runs, a little eddy occurring behind it as it recovers its position. The stream then goes directly to the pulmonary sacs and thence returns to the heart.

In *Clubiona* the globules are elliptical and very long, with a dark speck about

Explanation of the Figures.

PLATE XVII.

- Fig. 1. *Dysdera H. Templetoni*, female.
 2. ————— male.
 3. Seen in profile.
 4. Anterior superior part enlarged to shew the position of the eyes.
 5. The eyes seen from before.
 6. ————— seen from above.
 7. The mandibles from behind, with 2 teeth on the nearer edges of the cavity for receiving the claw, and one on the farther.
 8. The maxilla and posterior lip; the inner labial edges of the jaws are membranous and pass behind the lip, the jaw becoming suddenly, not gradually, incassate.
 9. The palpus of the female.
 10. *Oonops pulcher*, female.
 11. Profile.
 12. Eyes seen from above.
 13. ————— in front.
 14. Mandibles.
 15. Parts of the mouth.
 16. Male palpus.
 17. A hair from the palpus of the female to shew its serrated structure.
 18. Tip of the hind leg, to shew the appendicial joints and the claws, with the little pellucid body between on its peduncle.

the position of each focus; they are not numerous, being in the pedal arteries about two or three times their own length asunder, one only passing at once through the tube: in the veins however they lie closer together.

I remember last year seeing what I thought was the motion of a fluid in the legs of *Ciro alatus*. If this observation was correct, accurate examination may make this a test of the position of these minute tribes: it lies open to future investigation.

ART. LVI. *Account of several Fishes and other Animals of Jamaica.* By E. N. BANCROFT, M.D. In a Letter to the Editor.

Kingston, Jamaica, 24th July, 1830.

DEAR SIR,

I HAVE not been able to acknowledge sooner the favour of your letter of the 17th of last November. I was indeed partly induced to delay my answer from the expectation you had therein held out to me of a farther communication with such portions of the Zoological Journal as relate to the objects I sent to you twelve months ago; but these I have not yet had the satisfaction of receiving.

This letter will, I believe, be forwarded by the packet, which is to sail on the 3d of next month; and in it I shall give you some account of the contents of several packages which I proposed to send you by the ship *New Prospect*, that will sail for London at the end of this month. The first package to be mentioned is a cask with *compressed* sides (as it may to you be termed) called a breaker, a form which I preferred on account of one of the Fishes to be sent in it, a *Cephalopterus* hitherto, I believe, unknown.

I have to regret that this specimen in particular, and some others of the Fishes, are not quite in their natural colours. I had directed the first to be put into strong brine, and this it seems was done by a servant in a large copper boiler, there being no other vessel at hand to contain a fish of its size and shape, and the brine was occasionally renewed to prevent putrefaction; but I had the mortification to find very lately, when I had the fish taken out to be put into the breaker, that some portion of its surface had acquired a green colour from the copper, an alteration I had not been previously informed of. It appears that the servants were able to remove some part of the green colour; but I was afraid of their injuring the skin if they continued to rub it; and although I hesitated for some time about sending this specimen, yet I thought it best to send it in

the end, because it appears to be a rare fish here : for no other has I believe been caught since that one. It is highly probable that the green colour may be entirely removed ; but even if this should not be effected, there remained enough of the original purplish colour on the fish's back to show what it formerly was at the time I put it into the breaker. In case however that the original colour should have suffered any change from the action of the spirit in the cask, I venture to send inclosed one or two attempts of mine at a figure of the fish. They were meant solely as memoranda for my own private use, and were made hastily during uneasy moments ; and their defective execution would have deterred me from submitting them to the severe scrutiny of Zoologists, had not the hope that their fidelity as to colouring and as to shape and dimensions might palliate their defects, at length overcome my objections. This specimen appeared to me, when taken out of the brine, to have shrunk ; it originally measured 17 inches from the apex of the frontal flappers, or fins, to that of the ventral fins, and 28 inches in extreme breadth across the wings ; the tail being 21 inches long. About twelve months ago another of the same species, a male, was sent to me ; but I had been called out of town for three or four days, and when I returned home the fish was so putrid as to be useless. Its dimensions however were rather larger ; its length, measured as above, was 32 inches, its extreme breadth 44 inches, and its tail 27 inches. This individual had the male appendages, as Colonel Montagu has called them, arising on the interior edge of the ventral fins, very distinct ; I have reason to consider it as an adult.

Though I have taken notes of the characters of this Fish, yet I abstain from sending them, as they would be useless to Mr. Bennett, who I hope will continue his favour to me and mine, and take this and the other Fishes now sent under his own protection. He will observe in it one deviation that is perhaps unique in the *Ray* tribe, and will therefore serve as a marked specific character, in the position of its spiracles. There are clearly none on the dorsal surface, whence I was led to suppose them wanting, as in some *Sharks* ; at last however I discovered them in a groove immediately under the anterior edge of the base of the pectoral

fin, at only half an inch behind the eye. I would submit also to Mr. Bennett's notice the substitute for teeth with which the edges of both lips are provided, in the form of a "pavé" of flattened semi-transparent oblong hexagonal bony substances. Several *Rays* have a structure somewhat similar, but I have never yet seen that any authour has adverted to it, although it is assuredly deserving of attention, as well for its suitableness to the animal's wants, as for its regularity and beauty*.

The next object to be mentioned is an *Echeneis*, which it seems to me cannot with propriety be considered as *Ech. Naucrates*, and, if not, must be regarded as a new species undescribed. Of this I send two specimens, the intestines of one of which I was obliged to have taken out, on account of the degree of putrescence they came into before I had finished the notes and sketch I took of it. This individual was a male, and measured $32\frac{1}{2}$ inches from the apex of its inferior jaw to the tip of the upper portion of the caudal fin. The other was an inch and a half longer, but from the flabbiness and light colour, and mottled appearance of the skin, I supposed it to be an old one or else in a sickly state, and therefore a less perfect specimen of the proper colour of the species than the shorter one; especially as one or two others in a very healthy state that I have seen were exactly of the same dark hue with the latter. My chief reasons for considering it as a distinct species from *Ech. Naucrates* are that the Naturalists, whose works I have been able to consult, agree in assigning the following characters to

* The several *Fishes* forwarded by Dr. Bancroft were exhibited at the Meeting of the Committee of Science and Correspondence of the Zoological Society on September 27, 1831. Of this exhibition a notice was published in the "Proceedings" of the Committee (Part I, p. 134), together with characters of the new species.

That of the *Cephalopterus* is as follows:

CEPHALOPTERUS HYPOSTOMUS. *Ceph. lævis; ore infero; pinnarum pectoralium margine antico declivi recto; spiraculis in fossâ sub basi anticâ pinnarum pectoralium positâ.*

TAB. SUPPL. I.

Ech. Naucrates,

while in our Species they are
as stated below.

- | | |
|---|--|
| 1. Body green; beneath the lateral line white. | 1. Body without the slightest tinge of green, but of a full black on the upper and more anterior portion of the back, and of a dark grey over the rest of the body, with a lighter grey stripe from near the eye to near the vent. |
| 2. All the fins except the caudal yellow, and edged with violet. | 2. All the fins of a dark grey passing into a black at the anterior and outer portions. |
| 3. Lateral line white. | 3. Lateral line consisting of very small black points. |
| 4. Iris golden yellow. | 4. Iris a pure white. |
| 5. Tail fin entire. Shaw adds that it is ovate. | 5. Tail fin forked. |
| 6. Skin naked. | 6. Skin scaly. |
| 7. 24 bars on the disk. | 7. 22 to 25 bars on the disk. |
| 8. In the figures of Shaw and Bloch the pectoral fins are rounded at the tip. | 8. Pectoral fins very acute at the tip. |

I had at first included in the above enumeration a difference as to the dorsal fin, which is always described as being single in *Ech. Naucrates*, and which I found double in the first two or three individuals of our *Echeneis* that I saw: but in the last specimen I met with, the larger one now sent, it was likewise single; nor have I seen fishes enough to authorise me to say whether the fin be generally single or double.

I have just stated the skin in our species to be scaly, and I beg to call Mr. Bennett's attention to a peculiarity in the scales that I have never noticed before, either in authours or in nature. The scales appear to be of two sorts; one of them is larger, rhomboid, reticulately disposed, and dark coloured, forming as it were the *ground* scales; the other much

smaller, sub-ovate, light coloured, sometimes single, more commonly disposed in small imbricated patches over the large rhomboid scales, the whole of those upon any one of the latter scales seldom covering a larger space than would be equal to half its area.

It may be presumed that Dr. Patrick Browne had never seen this species, from his character of "pinnis posterioribus albo marginatis;" which can scarcely apply to *Ech. Naucrates*, unless the specimen he had seen had had the original tinge of the margin of the fin obliterated by time or by being kept in spirits. Nor does he or any other authour cite *Echeneis Remora* as existing in these seas; yet I have a specimen of it which I myself took from the gills of a *Xiphias*, of which I shall perhaps say something by and bye.

The same motives that lead me to send you my drawings of the small *Cephalopterus*, induce me to inclose my figure of the above *Echeneis*.*

But whatever satisfaction this fish, if it shall prove to be a non-descript, may from its novelty afford to Mr. Bennett, there is one organ common to the genus, from the investigation of which I cannot but believe that he will derive yet greater pleasure. I allude to the structure and functions of the disk on the head, which have been hitherto very imperfectly noticed, although they well merit careful examination, and will afford a new illustration of the adaptation of means to ends with which the works of the Creator are so replete. It seems to me passing strange that an organ, which obviously performs so important an office in the œconomy of the fishes of this genus, should have been so long ignored, and so generally slurred over by Naturalists with even Linnæus at their head; for surely his character of it, "Caput supra planum" "marginatum, transversè sulcato-serratum," will be found to deserve no

* This *Echeneis* is characterized in the "Proceedings" of the Committee of Science and Correspondence of the Zoological Society, as the

ECHENEIS LUNATA. *Ech. corpore elongato, squamoso; disci striis 22—25; pinnâ caudali lunatâ; pectoralibus acutis.*

D. 30 vel 32. A. 30 vel 33. C. 16. P. 21. V. 6.

better epithet than the latter, when its peculiar structure shall have been explained. Neither does the great Cuvier appear to have studied it (probably from the want of a good specimen) as is evident from the doubt he entertains as to its *modus operandi*; “le poisson se fixe aux différents corps, soit en faisant le vide entre les lames transversales, soit en accrochant les épines de leur bords.” Bosc is the only one who has expressed a just notion on this subject; “je reste persuadé que c’est en faisant le vide que l’Echeneis se fixe,” (Deterville’s Dict. d’Hist. Nat. t. 10, p. 46.) but he has left us nearly as much in the dark as to the anatomy of the part as his predecessors. Yet the whole of its conformation is most curious. After dissecting such a portion of it as exhibited its structure, I made sketches of the various bony and cartilaginous pieces and of the several sets of muscles that act between them, and drew up some account of its structure. But having afterwards succeeded in getting a second specimen of the fish, I have determined to send it to Mr. Bennett’s (and, if necessary, to Mr. Yarrell’s) charge, and to request them to undertake a labour for which they are far better qualified: and although I have since obtained a third specimen (which, with the first, is sent in the breaker) yet I have put into the cask with these a spare disk, which I partly dissected, that it might not be necessary to mutilate either of those specimens by removing its disk for the purpose of anatomical examination. The organ will be found nearly as complicated as the spine and the ribs in vertebrated animals, and there is some similarity in the play of the parts on each other so far as relates to the dorsal surface; yet the whole mechanism is singularly different, (one single transverse piece for instance supplying the place of one pair of ribs and of the body of the vertebra belonging to it,) and at the same time beautifully simple and efficient. The outer border of the disk would of itself suffice for mere adhesion to the surface on which it is applied, when a perpendicular force is exerted to pull it off, as in the case of the wet leather suckers that boys play with: but it offers no resistance, as I have found on trial repeatedly, to a force parallel to the surface, which causes the disk to slide over it in all directions. The mechanism of the *laminæ*, however, within the disk effectually supplies that deficiency. In their state of

repose these *laminæ* are inclined obliquely backwards, the posterior emerging from behind the anterior, and they lie in such close contact that there can scarcely be any void between them: but when the fish, after having attached itself by its disk requires to take the firmest hold of an object, it draws the *laminæ*, by means of the muscular apparatus of the organ, into a direction nearly perpendicular to the surface of attachment, and retains them in that position by the triple series of teeth on the edge of each *lamina*, the spaces naturally existing between the *laminæ* to the depth of about the fifth of an inch being at the same instant extended to their greatest capacity, and each contributing to form a considerable vacuum. So long therefore as this combined action is kept up, the disk remains immovable.

That the spare disk in the cask may be as little incomplete as possible, I inclose for Mr. Bennett three of the bones I had removed from it, one answering to the spinous process of a *vertebra* and the others forming two of the above moveable *laminæ*.

Before I conclude with this genus, I may notice a couple of errors that authors have fallen into concerning their motions. M. Risso, for example, describes them as lazy and slow; yet all admit that they contrive to fix themselves to fishes of great velocity, and in these seas they are very often found upon *Sharks*: how could they reach these, how could they detach themselves from their “conducteurs” to catch their fæces (on which Bosc asserts that they feed), and come up with them again, unless they were enabled to move with great speed? Some of our oldest fishermen here tell me that, although the *Echeneis* swims at a moderate rate when lounging, or going round their canoes in search of food, it will pursue its prey with great quickness; and to me the lengthened-conical form of its body, and the length and size of its dorsal, anal, and caudal fins, appear to be well adapted for great speed.

Another error, as I deem it, is that the *Echeneidæ* swim resupinately; yet *primâ facie*, this seems improbable, and no fisherman here has ever observed them swimming in that position.

There is a small *Nurse* in the cask, of which I sent you a specimen last year. I have since then detected the spiracles; they were very

small, and just behind the eyes. We must therefore consider the fish as a young *Squalus cirratus* (*Scyllium* of Cuvier). The adults of this species are sometimes found here of the length of 14 or 15 feet. They have generally 10 rows of teeth; not a common character with *Sharks*.

If Mr. Bennett should have the opportunity, I hope he will forgive my recommending to his study the forms of the teeth, and the number of series, in the different sub-genera and even species of the *Squalidæ*. I suspect that each will be found to have its peculiarities, so that the individual might be determined by the teeth alone, and perhaps by a single tooth.

I have also put into the cask a specimen of our *Sea-eel*, although it seems to be only the *Conger vulgaris**, and another, if I recollect right, of a *Scorpena*: but the note I had taken of the latter is mislaid, and I therefore abstain from saying more about it.

Three specimens of our *Yellow Snake* will be found in the breaker, which I beg to recommend to the attention of Mr. Bell, as this species (of *Boa*) has never been properly described. Sloane's account of its head and body being "of a dark brown colour, with some yellow streaks here and there," and of "the belly being all yellow," is very far from correct; and his figure of it is ridiculous, nay disgraceful. Dr. P. Browne's is less objectionable, and it notices the claws near the anus; yet it is not in strict accordance with truth, the Snake being

* The *Sea-eel* communicated by Dr. Bancroft is perhaps identical with the *Savanne* of Martinique (*Muraena Savanna*, Cuv.) a fish of which no distinguishing mark has yet been published, except that derived from the forward position of the commencement of the dorsal fin.

Dr. Bancroft's fish is characterized in the "Proceedings" of the Committee of Science and Correspondence of the Zoological Society as the

CONGER SAVANNA? *Cong. pinnâ dorsali ante basin pinnarum pectoralium incipiente: dentibus anterioribus conicis; lateralibus pluri-seriatis, seriei mediæ majoribus, parallelopipedis, cuneatis, serierum externarum internarumque minoribus granulatis rotundatisque, omnibus confertis; vomerinis mediis majoribus triangularibus, subrecurvis, compressis, lateralibus rotundato-granulatis.*

neither “*lutea*” (which, among Naturalists, signifies a golden-yellow, of which hue I have never seen a single scale in this species) nor “*maculis nigris notata*,” for the spots are strictly not of a black, but of a dark blue colour. One of them (with the more obtuse tail) I received alive, injured from bruises, but not lacerated; and from the great size of its abdomen, it seemed to be large with young. It was put into spirits within a very short time after it died; yet when I removed it into the cask, I was greatly disappointed at finding its abdomen in a most flaccid state. I nevertheless send it, (with two other specimens, much damaged about the head,) because certain parts or organs, being yet perfect, may prove useful, especially the head, the tail, and the claws near the vent. These last are well defined and will, I hope, claim notice from Mr. Bell. I say this, because, although the claws in question are a remarkable character in the *Boa* tribe, they have never been well figured, so far as I know. The best of the attempts I am acquainted with is in Abel’s plate of “the great Snake of Java,” p. 46 of his *Voyage to China*; but let his figure only be compared with the part in my specimen, and its imperfections will strike you. A correct representation therefore of this character seems to be a desideratum, at least in English works of Natural History; nor in the account of Professor Mayer’s investigation of this particular structure among the “*phænopoda*” of the Serpent race, given at p. 253, vol. III. of the *Zoological Journal*, is any mention made of figures to illustrate his descriptions.

There is a peculiarity moreover of our Yellow Snake which is deserving of attention: its pupil, during life, is linear and vertical. I have had several opportunities of observing the eye of this species, and, in one individual, I was able to watch it by day and by candle-light, for not less than six or seven weeks. The only variation I ever perceived from its usual form of a very narrow vertical line was upon one or two occasions (in the Snake first mentioned of the above three) when the length of the line was somewhat shortened, and its extremities slightly dilated, giving to the pupil a distant resemblance to an hour glass much lengthened out. As I have not seen any work or figure which alludes to any such form of the pupil among the *Ophidia*, (with the exception of Abyssinian Bruce’s

plate of the *Cerastes*, in which however the pupil is not linear, but elliptical, and acute at both ends, exactly as in Cats,) I regard this form as curious and interesting, and I accordingly inclose for Mr. Bell a slight sketch I made of it at the time, of the natural size, and with a note as to the colours of the iris, that he may clearly understand my meaning, if he should be induced, as I trust he will be, to give a coloured representation of the Snake. One of the three specimens was in its brightest hues when brought to me, for it appeared to have cast its skin just before, and it was really a showy and handsome Serpent; and as I have no reason to anticipate, from what I have seen as to this, or to other Yellow Snakes which I have kept in spirits for several months, that its colours will have materially suffered before it reaches you, it would therefore be the best type to select for a coloured figure. In favour of this Snake, whose cause I am willing as you see to plead, I may add that every scale on its back and sides, from the snout to the tail, (the abdominal and caudal *scuta* of course excepted) reflected that changeable lustre which the French call chatoyant; the light-brownish ones giving off a similar golden splendour, passing off into a vivid green, or light blue, with the blue scales; while these presented a rich Mazarine blue passing from the brightest to the fullest and darkest gradations according to the positions in which they are viewed.

In addition to the yellow, I have sent a small greyish Snake, a *Coluber*, which I presume to be undescribed. Sloane mentions a “*Serpens major cinereus*, of a light grey colour;” but as he applies the same epithet of major to the “*Serpens subflavus*,” our Yellow Snake, which he states truly to be 7 or 8 feet long, it is difficult to suppose that his Grey Snake means the small species now sent. His whole description is comprised in the above few words: and as Brown makes no allusion to such a Snake, it seems clear that he never saw one. Of this species I have lately received a live specimen, a little larger than that in the cask, and I found its pupil perfectly circular and black; the iris on its inner border was of a bright golden hue; but towards the middle, and on its outer circumference, it was set with minute brown dots which gave to it the appearance of a brownish outer ring.

I omitted to state, in regard to the specimen of the Yellow Snake which had recently shed its skin, that it has a much smaller proportion of the dark blue scales on the middle and posterior portions of its body than any others I have met with. Mr. Bell may perhaps ascertain whether this variation be accidental, or whether it should be ascribed to a difference of age or of sex. I shall also mention, on the authority of some planters of credit, that a number of Yellow Snakes, as 10 or 12, are not unfrequently met with in the woody parts of the Island with their tails twisted together, but the rest of their bodies free. This chiefly occurs about April and May, at their breeding season as is supposed: when thus surprised, they will raise their tails and hiss, and it takes them some time before they can unwind themselves and separate; so that any active person armed might then easily decapitate or destroy them. It seems not improbable that the sight of similarly convoluted Snakes gave rise to the old fable of the Lernean Hydra; and the feat of Hercules may have been merely that of a man, who, meeting with such a knot of Serpents, had the wit to assail them in their entangled state.

In the cask there is another sample of our Black Snake, which is some inches longer than the individual sent to you last year: pupil round, and with the iris deep black and shining.

I now come to the *Mollusca* class; and along with a second sample of the *Loligo* forwarded last year, which has been put up entire, with its ink bladder undisturbed, and which I believe to be the species alluded to by Pere Nicholson at p. 344 of his *Histoire Naturelle de St. Domingue*, you will find in the cask a large specimen that claims, I think, to be a new species, and distinct from *Loligo sagittata*. My reason for this is, that all the figures I have seen of the wings of the latter agree with Lamarck's character, "le bord supérieur" (antérieur would have been better) "de ces ailes est perpendiculaire à l'axe du corps, et ne s'insère pas de biais, comme dans le Calmar commun." Animaux sans vert., t. 7, p. 663. Now in the present species the anterior border is far from being perpendicular, and as far from being rhomboid; it is strictly cordate*. I regret that its viscera had been taken out previously to my

* I have just seen No. 1 of Guérin's *Iconographie de Cuvier's Règne Animal*, VOL. V.

receiving it from the neighbourhood of Old Harbour where it was caught; but I shall endeavour to get a perfect specimen, and in the mean time I trust this individual will be thought worth having, for it seems to surpass the “*taille gigantesque*” of the specimen mentioned by Lamarck in the Paris Museum, its extreme length (in its present shrivelled state) from the tip of the pedunculated arms to that of the tail being 28 inches; and its mouth, at least, affording a fine example of the parrot-beak of the *Sepiaria*. I hope that, if either Mr. Broderip or Mr. G. B. Sowerby will take this *Loligo* in charge, he will pardon my liberty in begging him to have the patience to look well at the cotyledons on the different arms, at their alternating positions, and at the varying forms of the dentated rings within them; for, although the rings are more or less set with teeth, either all round or on two opposite sides, yet those on one side are often very different from those on the other, three or five being frequently much larger than the opposite or the intermediate ones, and differing besides by their shapes, directions, and inclinations, each diversity nevertheless being evidently the best adapted for the action of its cotyledon in its respective situation. I nowhere find any mention of these peculiarities of structure, minutiae of this sort, however admirable for their contrivance, having been unaccountably overlooked or contemned. I suspect that the greatest possible differences would, on investigation, be found to exist among the *Sepiaria* partly as to the form of their cotyledons, and partly as to the structure and action of their cartilaginous rings. But whither am I going, and to whom do I presume to suggest enquiries?

Another *Molluscum* is also sent in the cask, an *Aplysia*: but “*quantum mutatus ab illo*,” as I saw it for a very short time before it died. Death produces a woeful alteration in the appearance of this tribe of animals; for the body and members are all so shrunk up, especially when preserved in spirits, that no one can form any just notion of the real structure or habits of the individual, from the mere inspection of a specimen in this state. Every little seeming wart or papilla now on its

and fig. 5, of pl. 1 of *Mollusques* represents *Loligo Brongniartii*, which has some likeness to that I send.

surface was in life a tentaculum more or less branched, semitransparent, agreeably coloured, varying from half to one inch in length, each arm of which used to stretch itself out in all directions, the different stems on the head, neck, and body alternately contracting or expanding, while the dorsal sack was constantly opening and shutting its edges, and the singular apparatus within in perpetual and curiously varying activity. These animals die shortly after being taken out of the sea; and although some of them have been brought up to me without delay in sea water, I have never had the time, even if I had possessed the ability, to draw their figure. Nor is there any artist here, that I know of, who is at all capable of doing justice to subjects of this description, of which there are here many hundreds probably of the most interesting kind. I must not omit to mention that this *Aplysia*, though apparently dead, afforded a liquor which, applied to linen, soon changed it to a good purple hue.

You are now informed of the contents of the breaker. Another package, a deal box, has also been sent to your address, which contains some bottles well secured from breakage, and other things. Among these I am glad to say there are some specimens in your favourite department of Ornithology, though I regret that they are not in the state in which I should have desired to send them. But I prefer much to receive them in an imperfect condition to being wholly without them, knowing that even in such a state they may still afford very useful information to an able Naturalist. The first I shall notice of these is a splendid species, to the characters of which I can find no parallel in any books I have. It was killed some time ago in Manchester, and appears to be extremely rare in the interior of the Island. The person who killed it has since died, and my endeavours to find out any particulars about the bird, and especially of the *areola* round the eye, and of the iris, have been fruitless. The horizontally produced upper mandible, the variety and brilliancy of its colours, and the contrast of the alar specula to its other hues will recommend this individual to your attention. 2dly. There is a variety of *Phaëton aethereus*, β , with this peculiarity, that it has but a single long feather in the tail, and that each of the tail feathers has its shaft black. That these are not accidental variations will be clear from their equally

existing in the two individuals I forward; the better of which in some respects had its upper mandible injured by the shot which killed it. 3dly. An *Hæmatopus*, which does not quite agree with the characters of the only three species I find described, viz. *Hæm. ostralegus*, *palliatu*s, and *niger*. 4thly. A *Sitta*, perhaps new, killed with the *Hæmatopus* at Cape Gracias a Dios. The *Phaëton* and the *Sterna* were shot at sea on the voyage thence. There is also a green Humming-bird, ill preserved, with its nest and eggs.

In a chip box within the above are a variety of Insects, mostly taken in my house or garden; among them are a male and a female *Curculio* finely marked with alternate stripes of black and metallic green, and a very handsome species of *Stygia*, (Lamarck, Anim. sans vert.) probably a nondescript. Its larvæ (of which two are sent in a phial) were marked with alternate bands of a brick-red colour and of black; they lived on the quinate leaves of a noble *Ipomæa* with large corollas of the brightest crimson, and descended from these, when disturbed, by a fine thread; their bite caused an acute burning pain. In the same phial with these will be found several Spiders, two of which are black and were marked with red spots, though the red colour has since wholly disappeared by the action of the spirit. The *upper* of these two, with three spots (formerly red) along the middle of the dorsal surface, and also a vase-shaped spot on the abdomen (the colour I ought to have said was of a bright crimson in all those spots) is what Brown has coarsely called the *Red-arsed Spider*, and is believed by all people here to be highly venomous, its bite affecting the system with severe general pains for months. It is chiefly found among timber and planks that have been undisturbed for a time, and hence carpenters are stated to be often bitten by them. I have sought for exact information on this head, but have not yet been able to procure any evidence of the fact that is positive. Sloane alludes to this Spider at p. 198 of vol. 2, No. 29, but as he had only seen one in spirits, he was not aware of its having been spotted with red. The *lower* of the black Spiders, to which the four ovaria in the same phial belong, is perhaps of the same species with the former, but I have not had the time to examine it minutely, and as yet only know that

it wants the dorsal spots. They are both females; the first mentioned one appears to be a *Drassus*, Walckenaer and Latreille. There is also in that phial a third Spider, very minute, resplendent with silver dots.

In a large bottle, together with 1. the olivaceous-brown Snake of this Island, I send, 2. a snake from Cape Gracias a Dios, in which the dorsal scales are generally pied, the anterior portion being more or less white, and the posterior black; and 3. another Snake from Carthage, called there by some name answering to our term of "Barber's pole," though I cannot guess why. Its black scales however are yet more curiously marked towards their base by a yellowish subelliptical spot along the middle with a white line diverging from it on each side; and 4thly. a specimen of what they here term "the double-headed Snake," which is perhaps what Shaw has called *Anguis Jamaicensis* (Gen. Zoology, v. 3, p. 588.), "*A. subargenteo-fuscescens*," although in this individual I can discern no silvery hue, and but a very faint resemblance to his figure of it: still less does it correspond with Dr. Pat. Browne's description and figure of *Anguis lumbricalis*. To me it appears to fall under Schneider's sub-genus *Typhlops*, and its form, its caudal aculeus, and some other peculiarities render it interesting, especially as the notions concerning the *Angues* (Linn.) have been loose and erroneous. It is a pretty creature, and will, I hope, deserve to be figured. Besides these *Ophidians* I send some number of different *Saurian Reptiles*, of which I will here only notice the three largest, viz. 1. *Ameiva vulgaris*, of which Shaw has given but an indifferent figure. I never saw a live one except at a distance in the bushes, else I would describe its hues, which are handsome, and cannot well be understood from a specimen in spirits. 2. A noble looking animal caught in the parish of Manchester, about the centre of Jamaica, and there called the *green Lizard*; and 3dly. another with a broad black stripe extending from the eye to the hind leg and bordered on each side with a narrow whitish stripe: this is supposed to assist the Snakes as an indicator of prey, and has thence obtained the name of the *Snake's Waiting-boy*. There are many other Lizards, of various sub-genera, some of them very diminutive; and of the whole I believe that the first mentioned is the only one that has been

made known. I therefore hope Mr. Bell will find occupation with them, and perhaps a treat. Some of the above I never had leisure to examine; but of several of the smaller ones I took memoranda while alive; and from these I might have been tempted to introduce some extracts, but that I have at last opened my eyes to the length to which this letter has already been protracted; and I will not therefore trifle longer with your patience farther than to say that there are in the other bottles a variety of our domestic Spiders, and of Insects, many among which may also be new.

I have the honour to be, dear Sir,

Your's very sincerely,

E. N. BANCROFT.

ART. LVII. *Observations upon the Dentalium subulatum of Deshayes. By the Rev. M. J. BERKELEY, A. M.*

DURING the summer of 1830 extensive soundings were made by Captain A. Vidal, R. N. on the N. W. coast of Ireland on the great bank running parallel with the coast, in search of Aitkin's Rock. A few of the specimens of sand, gravel, &c. from different parts of the bank having been kindly placed in my hands, I found amongst them several individuals of a *Dentalium* new to our coasts. These, on comparison with Madeira specimens from Mr. Lowe, and others in Mr. G. B. Sowerby's collection, proved to be the *Dentalium subulatum* of Deshayes, (Anat. & Monogr. du genre Dentale, p. 53); the only points of difference being a paler hue, and an almost total absence of the constriction near the orifice. The former difference is exactly such as might be expected from their occurring in a higher latitude, and the latter is clearly so variable, as not to throw any suspicion on the specific identity of the several specimens. They occurred in fine sand, at various distances from the coast, in lat. 55°, at great depths, from 60 to 120 fathoms. As I was not sure

that any were alive when taken, it became a matter of interest if possible to procure further information establishing the claim of the species to a place in the list of our marine animals: and I was the more anxious, as an examination of Mr. Lowe's specimens had convinced me that it was not a *Dentalium*, but formed a new genus among the *Annelida*. Accordingly, when in the following summer the survey of the bank was resumed, I requested Captain Vidal to preserve for me in spirits whatever animals he should procure alive in sounding; and if possible specimens of the *Dentalium*. This he very kindly undertook and noted the depth at which each specimen was taken. The *Dentalium* did not occur at any less depth than $63\frac{1}{2}$ fathoms, and twice (on one occasion off St. Kilda) it occurred at 171 * fathoms. Nothing could be concluded as to habit from the manner in which the shells were imbedded in the tallow, but this was of the less consequence as from information received from Mr. Lowe it appears that they are found in great numbers together, in masses of a conglomerate (if it may be so called) of mud and various marine substances, the broader end only appearing above the surface. From the amazing difference in the diameter, it should seem that the narrow or posterior end is gradually absorbed in the course of growth. The animals of the Madeira and British specimens, as was supposed, proved perfectly identical.

It will clearly appear from the description and accompanying figure that notwithstanding the resemblance of the shell to that of true *Dentalia*, it is most nearly allied to *Serpula*; but evidently distinct in having an unattached shell (for there is no evidence to lead to a suspicion that it is attached, even in infancy), and more especially in possessing a posterior as well as anterior aperture. I have therefore no hesitation in proposing a new genus *Ditrupa* ($\delta\iota\varsigma$ and $\tau\rho\upsilon\pi\eta$ foramen) for the reception of this and such other species now included in *Dentalium*, as shall be found to possess an animal similarly organized. One at least is so circumstanced, *Dentalium* in *Gadus*, Mont. (*Dent. coarctatum*, Lam.), of the

* A specimen of *Crania personata* was taken at the immense depth of 255 fathoms.

animal of which indeed I have seen only a single specimen ; but this was enough to prove it most clearly congeneric with *Dentalium subulatum*, though from the complete evaporation of the spirit in which it was preserved and the circumstance of the surface of the operculum being overgrown with *Ceramium repens* and another minute *Algæ*, I was not able to understand its structure sufficiently to give a figure. I at first thought that there were some appendages to the operculum : nor from the extreme minuteness could I ascertain so certainly the nature of a third substance, in addition to the two *Algæ* above mentioned, as to pronounce decidedly upon the point with such scanty materials. It is highly probable that the other minute British *Dentalia* will prove to possess an animal of like structure, though possibly even in that case it would be requisite to place them in a distinct genus.

The characters of the genus

DITRUPA

are as follows.

Shell free, tubular, open at both ends.

Operculum fixed to a conical pedicellated cartilaginous body, thin, testaceous, concentrically striate.

Branchiæ 22 in two sets, not rolled up spirally, flat, broadest at the base, feathered with a single row of cilia.

Mantle rounded behind, slightly crisped, denticulated in front, strongly puckered on either side.

Fascicles of bristles 6 on each side.

I take this opportunity of referring to the two *Serpulæ* described in Vol. 3, p. 229. Since the account there given was published I have dredged several specimens of *Serpula Arundo**, and find my former observations confirmed. It belongs to the genus *Sabella* as characterised

* *Serpula Arundo*, Turton, *Serp. tubularia*, Mont. The latter name being the original ought to be retained, and the species named *Sabella tubularia*, *Serpula tubularia*, Turt. is quite a different species, and the same with *Serp. vermicularis*, Lam., excluding var. b. I am obliged to Dr. Johnston for calling my attention to this point in Loudon's Magazine of Natural History, vol. 7, p. 126.

by Cuvier, being one of the rare instances in which a calcareous tube occurs in that genus.

For the other, *Serpula Filograna*, I beg leave to propose a new genus which will be characterised by the nature of its opercula and number of branchiæ, and may be called *Filograna*; in which case, Turton's specific name *implexa* will be very appropriate.

FILOGRANA, nob.

Shell very slender, filiform, gregarious.

Branchiæ 8, filiform, of which two bear an infundibuliform obliquely truncate operculum.

Mantle rectangular.

Fascicles of bristles 7 on each side.

Reference to the Figures.

PLATE XIX.

Fig. 2. *Ditrupa subulata*.

a. The animal.

b. One of the branchiæ.

c. A portion of the anterior part of the mantle.

d. Operculum.

ART. LVIII. *Description of the Animals of Voluta denticulata, Mont. and Assiminia Grayana, Leach. By the Rev. M. J. BERKELEY, A. M.*

Voluta denticulata, Mont. (*Carychium Myosotis*, Michaud, Compl. de l'Histoire de Draparn.) and *Assiminia Grayana*, Leach, abound under stones in the salt marshes by the Thames at Gravesend. Having an opportunity of examining both in a living state in the summer of 1832,

I was surprised to find manifest indications that both were pulmoniferous, which were confirmed on a minute inspection of the internal structure, as far as perhaps could be expected in such small animals. I was enabled in the former to trace distinctly the course of the vessels, and was decidedly of opinion that the lungs were constructed for the breathing of air unmixed with water. In the other case I was not so successful, though the utmost pains were taken: but as the animal is only half the size the difficulty was much increased. I am enabled however to assert that I could detect nothing like branchiæ; and, what is more to the point, that the vault of the cavity of respiration was traversed by a multitude of minute vessels all tending one way towards a large vessel running down in the direction of the heart; which is exactly the structure in *pulmoniferous Mollusca*. This perhaps will be esteemed as decisive when the external characters of the animal are taken into consideration.

VOLUTA DENTICULATA, Mont.

Foot obovate-oblong, pale ochraceous with shades of cinereous, obtuse in front, more or less obtuse behind, not evidently composed of two laminæ.

Tentacula highly contractile, filiform, obtuse, cinereous, slightly annulated, darker at the tip; eyes at the internal base.

Muzzle porrected, not truly probosciform, lip large, notched in front as in *Limnæa*, cinereous: the central portion faintly annulated; on each side near the margin there is a round raised spot. Mouth furnished with a small tooth above.

Mantle closed all round, with the exception of a perforation at the point of juncture of the outer lip and spire for the admission of air.

Fæces cylindrical (as in *Limnæa*).

Operculum none.

If the mantle be carefully opened, and the vault of the cavity of respiration examined with a lens under water, the pulmonary veins are seen very distinctly running from all sides into one large vein, which runs close to the sac of viscosity and carries the blood directly into the heart. The sac of viscosity is very large, and without minute inspection might be taken for branchiæ: a comparison with that organ in *Lymnæidæ* veri-

fies the conclusions formed from a careful examination.

I speak with greater caution on the point in deference to Mr. Lowe's experiments on an animal evidently congeneric; and I do not advert to them as in the present Number some observations are made upon them, in consequence of a communication which was transmitted to him on the subject.

On seeing the animal I was immediately struck with its resemblance to that of *Physa* or rather *Aplexa*. On mentioning this to Mr. G. B. Sowerby, he informed me that he has some fluviatile *Limnæidæ* from South America which tend to confirm my suspicion. On the whole, I think that there can be little doubt that it is most nearly allied to *Aplexa*; and, as it appears to me, an object of some interest as connecting the *Limnæidæ* with *Carychium*, *Auricula*, &c.

ASSIMINIA GRAYANA.

Foot broadly obovate, obtuse, composed evidently of two distinct laminæ, the lower projecting beyond the upper, and separated from it by an accurately defined line; above fuscous, beneath olivaceous shaded with cinereous.

Tentacula very short and obtuse, fuscous, eyes at their tips.

Muzzle porrected, not truly probosciform, deeply notched in front, fuscous, strongly annulated; the edge of the lip paler: on each side is a groove running backwards from the base of the tentacula.

Mantle open behind.

Faces elliptical (as in *Cyclostoma*).

Operculum corneous, ovate, spirally striated.

The most remarkable circumstance in this animal is the position of the eyes, at the tip of the tentacula, as in *Helix* and its allies, and not at the base. It would appear as if there were in reality no tentacula and only the tubercle common to many *Mollusca* at the base of the tentacula, a little more developed than usual. The shell is so like that of some species of *Rissoa* that it is quite surprising that in Dr. Fleming's British Animals and Mr. Jeffrey's paper in the Linnean Transactions it should be placed in or close to the genus *Limnæa*. Dr. Leach seems to have formed his conclusions from an actual inspection of the animal, and con-

sequently made a distinct genus for its reception. In many points the animal resembles very much that of *Cyclostoma*, and is perhaps a step nearer than that and *Helicina*, which have the mantle open behind, to the *Pectinifera*. Its nearest ally however amongst the *pectiniferous Mollusca* I should conceive not to be *Rissoa*. That an opportunity of comparing the animals may be afforded, it may not be improper to subjoin a description of the *Rissoa subumbilicata* made at the same time. This species I have always found in brackish water amongst *Conferva*, *Ruppia*, *Zannichellia*, &c.

RISSEO SUBUMBILICATA.

Foot truncate in front, not grooved along the anterior margin, oblong, obtuse, the sides hollowed out; not composed of two distinct laminae.

Tentacula long, filiform, eyes on tubercles at their external base.

Muzzle probosciform, smooth, lip scarcely any.

Operculum corneous, spirally striate.

Fæces elliptic.

Placed in water it swims on the surface by means of its foot.

There are two peculiarities in this species not general in *Rissoa*, the hollowing out of the side of the foot and the absence of a short filiform appendage on each side of the posterior end of the foot above.

Reference to Figures.

PLATE XIX.

Fig. 3. *Voluta denticulata*.

a, a, a. Shell with the animal in different positions.

b, b. Different forms assumed by the foot.

c. Pulmonary veins and sac of viscosity.

d. Sac of viscosity opened to show that it is not a plume of branchiæ.

4. *Assiminia Grayana*.

a, a. } As in the last.
b, b. }

c. Is intended to show how the lower lamina of the foot projects beyond the upper.

5. *Rissoa subumbilicata*.

ART. LIX. *A description of the anatomical structure of Cerithium Telescopium, Brug. By the Rev. M. J. BERKELEY, A.M., and G. H. HOFFMAN, Esq.*

THE genus *Cerithium* is placed by Lamarck at the beginning of the first section *Canalifères* of his *Trachelipodes Zoophages*, immediately after *Turritella*, which closes the section *Trachelipodes Phytiphages*. The characters of the animal are evidently taken from Adanson, who informs us that one of the species lives in the sand amongst grass and mangroves, feeding on "scolopendres" and other small marine worms.

Cuvier places it immediately before *Murex*, after *Purpura*, *Cassis* and *Terebra*. This would imply a structure of the parts of the mouth adapted for boring shells, according to the known habits of *Murex* and certain allied genera. But a single glance at Adanson's figure is sufficient for conviction that the animal is much more nearly allied to the *Trochoides*; and that Lamarck judged rightly according to the evidence before him in placing it on the confines of his two great classes. And this is corroborated by the little additional information in the *Manuel des Mollusques* of M. Sander Rang, who describes the mouth as toothless but furnished with a small tongue.

In this state of information with regard to the habits and organization of the genus *Cerithium*, it was most gratifying to receive a living specimen of *Cerithium Telescopium* from Mr. G. B. Sowerby, as a prospect was offered of coming to some satisfactory decision as to the proper situation of the genus; though the species is one, which is not so nearly related as some others to the individual whose animal is figured by Adanson, and is indeed made a subgenus of *Trochus* after De Férussac by Sander Rang.

Though placed in fresh sea water, the utmost care being taken to renew it frequently, and all kind of marine substances which could be procured supplied for food, it refused all nourishment, contenting itself with simply walking over them, and in so doing touching them with its proboscis. It was exceedingly shy, so that with great difficulty a drawing was obtained of the animal exerted. As it declined all nou-

ishment, it was thought advisable after a few days to kill it by immersion in spirits, lest it should be unfit for dissection. Various engagements precluded the possibility of examining it for some weeks, and as partial decomposition had taken place, we almost despaired of success. Most fortunately we were able to procure through the kindness of Dr. Sibbald another specimen, brought from Ceylon, and thus were enabled to verify the observations made upon it. This however was by no means in so perfect a state as to supply all the information desired, and therefore if future opportunities of comparing the present account with abundant good specimens should prove us in any particulars incorrect, due allowance must be made. Our observations it will be seen establish completely the correctness of Lamarck's views.

Foot broadly obovate, subtriangular: sometimes when adhering to the side of the glass nearly round, thick; small for the size of the shell, without any groove in the anterior margin; above between umber and olivaceous, with a few brown freckles and wrinkles, not furnished with any fringe or cilia; below pale umber, cinereous.

Tentacula thickest at the base, then suddenly contracted and there bearing the eyes externally; the upper part much attenuated. The left tentaculum much longer than the right with a constriction in the middle of the attenuated portion.

Muzzle probosciform, contractile, as long as the foot, flat below, convex above and wrinkled transversely, of a deep olivaceous tint, and presenting very much the appearance of a *common Leech*; slightly notched in front; immediately below the notch is the aperture of the mouth. There is no crest or appendage to the lip.

Mantle with a very small canal; just within the outer edge furnished with small triangular teeth.

Operculum horny, round, convex within, depressed externally, spirally striate, the margin thin, transparent, ragged.

The spirits in which the animal was preserved were of a dark verdigris.

When removed from the shell it was found to consist of nearly $6\frac{3}{4}$ volutions; the first of which was very obtuse, and with the second green; the three following dark green.

Through the mantle are readily traced the rectum, matrix, sac of viscosity, stomach and liver. On opening this along the left side, the branchiæ, rectum and matrix are seen in situ.

The organ of respiration consists of a long single row of triangular plates, which are less and less elevated as they are more distant from the margin, and are at last little more than parallel wrinkles. The vessel which carries the arterial blood to the heart is distinctly traceable on the left side, running down to the heart which as usual lies close to the sac of viscosity; the auricle is small and curved; the ventricle much firmer and obovate. This gives off two large vessels and a smaller one, of which one supplies the liver, but before it reaches it gives off a large vessel above the rectum: the various ramifications in the liver are well marked; some of them are represented in fig. 3. The second vessel given off from the ventricle runs parallel with the heart and pulmonary artery to supply the anterior parts of the animal. The third passes immediately above a particular organ (*m. fig. 5.*) to be mentioned presently. We were not able to trace returning vessels.

The parts of the mouth are very small; the tongue very short, furnished as usual with regularly disposed reflexed teeth; the salivary ducts enter on each side above the point of insertion of the tongue, and after running down on either side of the œsophagus, suddenly turn back; and there the glands are seen curling from side to side, and at length united together just below the apex of the tongue. A single short flat ligament is attached to the mass of the mouth behind, and inserted into the foot beneath the œsophagus.

The œsophagus is very long, runs backwards to the stomach in the direction of the volution, and enters into it laterally at the further end. The stomach is of a very curious and complicated structure. It is divided by valvular processes into three portions, which are not however distinctly marked externally.

The first of these occupies rather more than the upper half of the whole stomach. It is into this, immediately above the constriction, that the œsophagus enters obliquely between two plates. Of these the external one runs down to the apex of the stomach; the inner runs only

third of that distance and is not so thick. The whole of this and the upper half of the second sac is divided into two by a thick crest-like fold. On each side of this, at the point where the œsophagus enters, the stomach is constricted, and on the exterior side is a valvular projection taking a spiral direction inwards.

In this upper portion of the stomach beyond the valve is a small rib running at first parallel with the crest, and when arrived at the apex turning round and again running parallel with the crest, thus forming a small loop within which are little concentric ridges, like the lines at the tips of the fingers; but these gradually become fainter, and the portion of the wall within the loop is thickened until it becomes confluent with the valve: the valve itself runs parallel with the loop for more than half of its length. Between the crest and this the coat is nearly smooth or very slightly wrinkled transversely; but on the other side of the loop near the constriction are some narrow thick parallel folds at right angles to the loop, beyond which again are some narrower more oblique folds.

The second sac is very small; the coat marked with a continuation of the same series of transverse wrinkles. To the portion of the crest in this sac is applied lengthwise a thin transparent plate marked with transverse lines, and dotted between them, which has a ridge with small teeth which project horizontally. We could not detect the mode of attachment, but supposed that it was free along the denticulated margin and fixed below. We found it however simply applied close to the crest, without any attachment. Our attention was drawn to it in consequence of the little teeth which make this portion of the crest appear as though it had a denticulated margin. Beyond the point where the crest terminates is a small cœcum, from which there is a communication round the crest with the passage down which the food passes in its entrance from the œsophagus. Beyond this is a valvular projection as before, but thicker than that in the first, the office of which seems to be to cut off at pleasure the communication down the channel just mentioned. Possibly something analogous to rumination may be carried on.

The third sac is still smaller; its walls are not marked with any remarkable rugæ, but internally there is a thick projection which seems a

continuation of that in the second sac. The valve of the pylorus is very imperfect.

From thence leads the duodenum, marked for a short distance with a continuation of the last mentioned projection, and then for its whole length with strong oblique lines: it follows the direction of the spiral till it reaches the heart, when it turns round and runs parallel with its former course, passing at length between the branchiæ and matrix till it ends near the margin of the mantle. The latter portion, which constitutes the rectum, is much and frequently constricted almost to the extremity.

The liver occupies the whole of the upper volutions. The structure of it is quite different from that of other Mollusca, as far as we can discover; and indeed from any represented in Müller's *Anatomy of Glands*. It resembles more the common structure of kidneys. In order to make this plainer it will be better to trace the course backward from the stomach. The bile is poured in at an orifice between the small crest-like process described above as close to the orifice of the œsophagus, and the large crest which divides the first sac into two. The biliary duct follows the course of the volutions and at short intervals communicates with small cysts perforated with the orifices of innumerable tubes radiating from a thin pale substance interposed between them and the external glandular portion of the liver. The glandular portion is pale olive, the intermediate substance white, and the tubes yellow brown. A vertical section of the liver presents a very interesting object.

Both the animals examined possessed a matrix, oviduct and ovaries. With regard to the male organs of generation we are possessed of no information. The ovaries are situated immediately above the duodenum. A slender thread proceeding from these by a straight course to a matrix, and entering it somewhat obliquely, is the oviduct. The matrix is very large and complicated, close to, and parallel with the rectum. It consists of three strong folds which fit over a thick longitudinal wrinkled rib so closely that it appears like a simple sac and requires a minute inspection to ascertain the real structure. Between this and the first fold are numerous little transverse indentations which appear externally like striæ. These doubtless form so many little bags for the reception of the eggs. Between

the first and second fold are a number of wrinkles.. The matrix terminates close to the anus.

Besides the organs above mentioned, there is a cylindrical body consisting of a rather firm transparent jelly, disposed apparently in layers, parallel to the rectum, and running along the duodenum as far as the pylorus. Of this no excretory tube could be satisfactorily traced, but it was supposed that it must secrete something necessary for the eggs.

The brain consists of four ganglions. The two upper ganglions are close together, as also are the two lower ones. The right upper ganglion sends off on its own side two principal nerves beneath the œsophagus, and one above it to the left. The left upper ganglion sends off two behind; and in front both send off to the parts about the mouth several nerves, of which the hindermost are forked at their origin from the ganglions. The two lower ganglions supply the tentacula, and from their lower part numerous branches penetrate the foot.

From the whole of the preceding account it is evident that we have before us an animal allied very nearly indeed to *Trochus*. Its external appearance is precisely that of *Turritella*, with the exception that in *Turritella* there is a membrane on the right side of the foot. The digestive organs are very like those of the *Trochus* dissected by Cuvier. The stomach would indicate that its food is either vegetable, or if animal, from its complicated structure, and the thickness of its coat in parts, something most probably of a crustaceous nature; and the very small powers of the mouth, ill fitted for constant gnawing, make it highly probable that its habits may be exactly those of Adanson's species. However this may be, there can be little doubt that they are most nearly allied. The small *Cerithium reticulatum* of our coasts in external structure is just the same, possessing appendages neither to the foot nor mouth.

Explanation of the Figures.

PLATES XX & XXI.

Cerithium Telescopium, Brug.

Fig. 1. Animal in its natural position as seen from above and beneath.

2. Animal taken from the shell.

a. Operculum.

b. Foot.

c. Muzzle.

d. Rectum.

e. Matrix.

f. Stomach.

g. Liver.

o. Organ (use unknown) belonging to the parts of generation.

x. Sac of viscosity and ovaries.

3. Cavity of respiration laid open.

a. Operculum.

b. Foot.

c. Muzzle.

d. Rectum.

e. Matrix.

f. Branchiæ.

g. Liver.

h. Vessel carrying blood from the branchiæ to the heart.

4. a. Pericardium.

b. Ventricle.

c. Auricle.

d. Sac of viscosity.

5. Cavity of the abdomen laid open.

a. Portion of the coat of the abdomen turned back.

b. Head.

d. Rectum.

- e.* Matrix.
- f.* Stomach.
- g.* Liver.
- t.* Duodenum.
- o.* Œsophagus.
- m.* Accessory organ of generation.
- r.* Branchiæ.
- α.* Ventricle.
- β.* Auricle.
- τ.* A portion of the ventricle cut off.
- δ.* Large artery to the anterior.
- π.* Large artery to the liver.
- 6. Plate from the interior of the stomach.
- 7. Vertical longitudinal section of a portion of the liver.
 - a.* External coat consisting of granules, globular in the circumference, within more oblong.
 - b.* A thin apparently homogenous layer interposed between these and the tubes
 - c.* carrying down the secreted bile into the biliary duct.
 - d.* Biliary duct divided longitudinally with its cyst.
- 8. Vertical transverse section.
- 9. A small portion of ditto.
Letters as in fig. 7.
- 10. Stomach laid open.
 - o.* Œsophagus.
 - k.* Orifice of ditto.
 - a.* Accessory organ of generation.
 - d.* Duodenum.
 - g.* Liver.
 - α.* Large crest.
 - β.* Situation of toothed plate, (fig. 6.)
 - γ.* Second sac, the dark part above its cœcum.
 - δ.* Third sac.
- 11. Matrix.

- a.* Operculum.
 - b.* Foot.
 - c.* Muzzle.
 - d.* Mantle.
 - e.* Wrinkled rib over which the three folds of the matrix fit.
 - f.* Oviduct.
 - t.* Neck of matrix.
 - α. β. γ.* The three folds.
 - 12. Ovaries exposed in situ.
 - g.* Liver.
 - f.* Stomach.
 - s.* Integument.
 - r.* Ovaries.
 - t.* Matrix.
 - o.* Oviduct.
 - 13. *m.* Mass of mouth.
 - r.* Wall to ditto.
 - α.* Left upper cerebral ganglion
 - β.* Right ditto.
 - r. δ. ε.* Nerves from lower part of right ganglion.
 - ζ. η.* Ditto from left.
 - o.* Œsophagus.
 - 14. *t.* Tongue.
 - m.* Mass of mouth.
 - s.* Salivary glands.
 - d.* Salivary ducts.
 - o.* Orifice of ditto.
 - α.* Œsophagus.
-

ART. LX. *Insectorum Arachnoidumque novorum Decades duo. Auctore J. O. WESTWOOD, F.L.S. &c.*

COLEOPTERA (PENTAMERA). Familia dubia.

CUPES, Latr.

Cup. concolor, Westw.

Sub-albido-luridus; capite inæquali concolore; elytris 6-punctato-striatis, interstitiis lituris quibusdam longitudinalibus brevibus obscuris notatis, fascias tres valdè obliquas et interruptas formantibus, quarum fasciarum intermedia latior est, et pone medium elytrorum posita. Antennæ subdepressæ nec cylindricæ.

Long. corp. lin. 5.

Habitat in Americâ boreali, "New Harmony," etiam in Americâ meridionali, Valparaiso??

In Mus. Soc. Nat. Hist. Belfast, Dom. Hope, et nostr.

HYMENOPTERA (ABERRANTIA, Westw.). Fam. *Siricidæ*.

ORYSSUS, Latr.

Or. Sayii, Westw.

♀. Niger; capite thoraceque punctatis; abdomine subtiliùs punctato; vertice, ad regionem ocellorum, tuberculato; facie lineis duabus minutis abbreviatis albis inter oculos ad marginem inferiorem; labro albido; antennis nigris, apice articuli 3tii articulisque 4to et 5to supra albo-notatis; pedibus nigris, apice femorum lineolâque superâ tibiali albis; alis dimidio basali hyalinis, dimidio apicali fuscis et ad costam obscurioribus, maculâ parvâ substigmatali apiceque ipso hyalinis, stigmate nigro.

Long. corp. ♀ lin. $7\frac{1}{2}$. Exp. alar. lin. 11.

Habitat in Americâ boreali, "New Harmony."

In Mus. nostr. Dom. G. B. Sowerby communicavit.

NOTE. In the Encyclopédie Méthodique, Vol. 8, p. 561, a second species of this remarkable genus was added by Latreille under the name of *Or. unicolor*, of which both sexes had been captured in the Bois de Boulogne, near Paris. Its characters very much resemble those of the species above described, except that *Or. unicolor* is only half the size of *Or. coronatus*, whereas my new species is somewhat larger than that insect.

HYMENOPTERA (NORMALIA, Westw.) Fam. *Crabronidæ*.*CHEILOPOGONUS*,* Westw.

Genus *Cerceridem* cum *Philantho* arctè conjungens. Antennæ subdistantes (spatio illas ad originem separante spatium inter illas et oculos æquante), thorace evidenter multo breviores, ♂ sensim incrassatæ, articulo 3tio longiore subcylindrico, ultimo obliquè truncato; mandibulæ internè inermes; oculi internè incisione minutâ. Areola submarginalis 2da anticè sessilis, posticè haud completa, (Fig. 4 a.) Caput magnum, facies fere rotundata, clypeo anticè paullo producto et dentibus 3 minutissimis obtusis in medio armato, ad latera pilis longissimis rigidis obliquis mandibulas obtegentibus vestito. Abdomen subovale rugosè punctatum, segmentis subcoarctatis, 1mo subnodiformi, ultimo (♂) dentibus 2 parvis terminato, (Fig. 4 b). Pedes spinis fossoriis muniti.

Sp. 1. *Cheil. punctiger*, Westw.

Niger nitidus, valdè rugoso-punctatus (præsertim abdomine); antennarum articulo 1mo ad apicem, facie maculis 4 quadratè positis, vertice maculis 2 minutis, lineisque 2 pone oculos, collari fasciâ posticâ, scutelli mesothoracici et metathoracici fasciâ transversâ, abdominis segmento 2do latè ad basin, segmentis 3tio, 4to et 5to fasciâ apicali, scapulisque flavis; pedibus flavis, femoribus basi obscuris; alis fulvescentibus, anticè versus apicem obscurioribus.

Long. corp. lin. 4. Expans. alar. lin. 7.

TAB. XXII. Fig. 4. a and b.

Habitat in America boreali, "New Harmony."

In Mus. Soc. Hist. Nat. Belfast.

ORTHOPTERA. Fam. *Mantidæ*.†*METALLYTICUS*,‡ Westw.

Corpus oblongo-ovatum, depressum, metallicolor. Prothorax lati-

* Χεῖλος labrum, et πωγων barba.

† The characters separating *Empusa* from *Mantis* and *Phyllium* from *Phasma* are surely not of sufficient importance to raise these several genera to the rank of families as has been recently proposed in the Entomological Magazine.

‡ Μεταλλευτικός, metallicus.

tudine vix longior, (quartam partem longitudinis abdominis vix æquans,) lateribus fere rectis, absque dilatatione laterali, anticè haud angustatus. Oculi maximi rotundati. Caput muticum, vertice plano. Pedes antici maximi; femoribus brevibus crassissimis; femora 4 postica simplicia, quam in *Mantide* crassiora. Abdomen versus apicem acuminatum, apice ejus tegminibus alisque perfectis haud oblecto. Antennæ simplices.

NOTA. Generi *Mantidi* (ut a Servilleo restricto) affinis. Differt prothoracis brevitate, abdominis apice detecto, coloreque metallico.

Sp. 1. *Met. splendidus*, Westw.

Viridis nitidissimus; tegminibus cupreo-nitentibus; femoribus anticis maculâ centrali fulvâ.

Variat colore purpureo, femoribus 4 posticis anticè subfulvis.

TAB. XXII. Fig. 1.

Long. corp. lin. 14. Expans. tegminum lin. 22.

Habitat in Malabariâ.

In Mus. nostr.

ORTHOPTERA. Fam. *Phasmidæ*.*

ASCHIPHASMA,† Westw.

Corpus longum subcylindricum, alatum, tegminibus obsoletis. Caput fere quadratum angulis rotundatis, suprâ læve, haud tuberculatum. Oculi magni subfrontales. Ocelli nulli. Antennæ corporis toti fere longitudine, frontales. Prothorax quadratus mesothoracis longitudinem fere æquans, tuberculis duobus parvis anticis. Mesothorax paullo longior quam latus. Tegmina omnino obsoleta. Alæ magnæ abdominis fere longitudine, semicirculares. Pedes et abdomen simplicia subcylindrica.

Sp. 1. *Asch. annulipes*, Westw.

♀ Sordidè viridis; capite prothorace et mesothorace lineis notulisque

* Although numerous instances occur in which the mesothoracic organs of flight are alone developed, this is the only insect in which I have hitherto noticed the metathoracic ones alone to exist. In all the specimens which I have seen the same structure prevails.

† A privativum, et σκιπασμα tegmen.

quibusdam aliis pallidioribus signatis ; femoribus tibiisque viridibus basi et pone apicem latè albido annulatis, tarsis albidis articulorum apicibus obscuris ; antennis fusciscentibus basi pallidioribus ; abdomine sub-fusco ; alis fusciscentibus immaculatis nisi costâ latâ (tegmen referente) viridi, maculis numerosissimis parvis (interdum confluentibus) nigris undique notatâ.

Long. corp. lin. $2\frac{1}{2}$. Exp. alar. lin. $3\frac{1}{4}$.

Habitat in Javâ.

In Mus. nostr.

ORTHOPTERA. Fam. *Gryllidæ*, Leach.

(Locustariæ*, Latr. Locustina, McL. Gryllus Tettigoniæ, Linn.)

STRONGYLODERUS,† Westw.

Thorax maximus, convexus, fere rotundatus, diametro transversali longitudinem tertiâ parte superante, lateribus serratis, disco tuberculis parvis instructo. Caput transversum, thorace immersum, vix dimidii thoracis latitudine ; inter antennis dente parvo acuto canaliculato armatum ; facie latâ. Antennæ tenues (in specimine nostro unico mutilato, totâ parte superstite longitudinem corporis insecti æquante). Abdomen vix thorace longius, convexus, basi latum, sensim attenuatum. Pedes longitudine mediocres, validi, dentati, præsertim postici. Tibiæ anticæ basi subocellatæ. Tarsi 4-articulati, breves, articulo 3tio bilobo. Prosternum haud dentatum.

The singular insect upon which I have established this genus is in an apparently imperfect state, very minute rudiments of tegmina alone being visible, and the metathoracic segment being destitute of any appearance of wings. Whether however it may not belong to M. Serville's subapterous section must be decided by the examination of other specimens ; my insect is a ♂, and its size, nearly an inch long, is noticeable as bearing upon the question of its perfection. The form of the thorax (or rather

* Nomen Locusta pro Locustis voracibus in Bibliis sacris (*Locusta migratoria*, &c.) commemoratis retineri debet.

† Στρογγυλόω rotundo, δερη collum.

prothoracic shield) being similar in the imperfect states of this order to that of the imago has induced me to characterize it as a group, without hesitation, from the almost anomalous form of that part of the body.

Sp. 1. *Strong. serraticollis*, Westw.

Fulvus; thoracis disco sub-testaceo; antennis fusco annulatis; abdominis segmentis 4-7 in medio obscurioribus; tuberculis discoidalibus thoracis nigris, thoraceque utrinque punctulis numerosis elevatis.

Long. corp. lin. 10. Thoracis latit. lin. 6.

TAB. XXII. Fig. 2.

Habitat in Malabariâ.

In Mus. nostr.

ORTHOPTERA. Fam. *Locustidæ**, Leach.

(*Gryllus Locusta*, Linn. *Acridia*, Latr. *Acridina*, McL.)

TRIPETALOCERA,† Westw.

Tetrici (*Acrydio*) affinis. Antennæ corporis dimidii longitudine, crassæ, diffformes, articulo 1mo brevi, 2do brevissimo, 3tio longo lato supra plano subtus laminâ tenui horizontali instructo, incisionibus 4 marginalibus quasi articulos indicantibus, articulo 4to multo brevior subtus laminato, ut in præcedenti, articulo 5to majore apice latiore, etiam similiter laminato, articulo 6to minutissimo, ovato-conico. (TAB. XXII. Fig. 3.) Oculi valdè prominentes. Caput inter antennis spinâ bifidâ armatum. Prothorax corpus totum obtegens rigono-lanceolatus, inter pedes 4 anticos utrinque uni-spinosus, dorsoque in medio trigono-elevato.

Sp. 1. *Trip. ferruginea*, Westw.

Fusco-ferruginea, obscura, rugoso-punctata; prothorace versus apicem lineis duabus lateralibus elevatis angulosis; oculis pallidis.

Long. corp. lin. $6\frac{1}{2}$.

* I follow Linnæus and Leach in giving to the family of the Grasshoppers with short antennæ the name of *Locusta*, including also those whose ravages are so well known.

† Τρεις tres, πέταλον folium, et κρας cornu.

Habitat in Malabariâ.

In Mus. nostr.

HETEROPTERA (GEOCORISA). Fam. *Pentatomidæ*.

DEROPLOA,* Westw.

Scutelleræ affinis. Corpus ovatum, depressum. Antennæ breves 5-articulatæ, articulo 1mo minutissimo, 2do paullo longiore, 3tio reliquis longiore, ultimo paullo crassiore. Thorax lateribus posticis utrinque in spinam magnam obtusam elevatam anticè porrectam productis. Scutellum magnum ovatum depressum inerme, abdomen fere obtgens.

Sp. 1. *Der. parva*, Westw.

Castanea punctatissima; thorace anticè, scutelli lineâ gracili dorsali interruptâ, maculisque quibusdam minutis flavis; pedibus fusco-rufis, tibiis annulatis.

Long. corp. lin. 2. Latit. thoracis lin. $1\frac{3}{4}$.

TAB. XXII. Fig. 6.

Habitat in Novâ Hollandiâ.

In Mus. nost., &c.

NOTA. Congenerica? *Cimex Desfontainii*, Fab., Coq. t. 10, f. 5, e Barbariâ.

(*PENTATOMA*, Latr.)

Pentatoma verrucosa, Westw.

Rufo-testacea, fusco variegata, punctata, subrotundata; thoracis lateribus posticis utrinque uni-spinosis; dorso lineis quibusdam elevatis obliquis; scutellum tuberculis duobus magnis rufis rotundatis basalibus, alterisque duobus parvis lateralibus, posticè angustatum, et ad apicem abdominis productum, parte posticâ concavâ, lateribus elevatis; hemelytrorum corium rufum, nigro-punctatum, membranâque apicali ultra abdomen longè productâ; abdominis latera detecta serrata; antennæ thorace longiores articulis 2do et 3tio longitudine æqualibus, etiam 4to et 5to, qui præcedentibus duobus paullo longiores sunt; femora subtus uni-spinosa, antica crassiora, tibiæ 2 anticæ dilatatæ, 4 posticæ simplices

* Δερον collum, et σπλον arma.

rufæ, annulo albo.

Long. corp. (hemelytris inclusis) lin. 5.

TAB. XXII. Fig. 7.

Habitat in Malabariâ.

In Mus. nost.

HETEROPTERA. Fam. *Lygæidæ*.

*PLATYDIUS**, Westw.

Megymenum, Guer., habitu quodammodo simulans. Corpus oblongo-ovatum, subdepressum. Antennæ sub capitis marginibus insertæ, vix thoracis longitudine, 4-articulatæ, articulo 1mo brevi, 2do magno dilatato elongato-ovato, depresso, 3tio minori, ultimo vix magnitudine articuli primi, acuminato. Caput planum lateribus elevatis posticè in collum contractum: oculis magnis; ocellis duobus. Rostrum 4-articulatum, ad basin pedum intermediorum extensum, articulo secundo longiore. Thorax transverso-quadratus, anticè utrinque, pone oculos, uni-spinosus, lateribus dilatatis, irregulariter serratis; scutellum vix abdominis dimidii longitudine, posticè subcordatum. Hemelytra abdominis margines serratos haud obtegentia, membranâ apicali magnâ nervosâ.

The *Edessa brevicornis* of Fabricius is referrible to this genus, and may be considered as its type. In the species above described the intermediate as well as the anterior femora are toothed beneath. The genus comprises several distinct species, all of which appear to be inhabitants of the South-eastern parts of Asia.

Sp. 1. *Plat. subpurpurascens*, Westw.

Capite, thorace, scutello, corioque hemelytrorum fusco-purpureis, membranâ apicali fulvescente, hâc obscurè nervosâ; antennis pedibusque nigris. Corpus subтус purpureum.

Long. corp. lin. $7\frac{1}{4}$. Latit. abdominis lin. 4.

TAB. XXII. Fig. 8.

Habitat in Javâ.

In Mus. nost., &c.

* Πλατυς planus.

HETEROPTERA. Fam. *Reduviidæ*.*OPISTOPLATYS*,† Westw.

Reduvio affinis. Corpus pyriforme depressum, abdomine plano. Caput parvum, porrectum, tuberculo utrinque ante oculos, in quod insident antennæ (in specimine nostro mutilatæ) articulis duobus basalibus æquè longis, pilosis, articulo basali crassiore capite paullo longiore. Rostrum thoracis longitudine. Thorax capite latior præsertim in parte posticâ, in lobos duos ad latera rotundatos suturâ transversâ divisus. Abdomen anticè thoracis latitudine, posticè multo latius, supra concavum, lateribus paullo elevatis, hemelytris haud obtectis, posticè emarginatum. Hemelytrorum corium parvum longitudoiale, membranâ apicali maximâ. Pedes sat longi, graciles; tarsis 3-articulatis articulo 1mo brevi.

Sp. 1. *Op. Australasiæ*, Westw.

Fuscus, pilosus, hemelytrorum membranâ apicali nigrâ.

Long. corp. lin. $6\frac{1}{2}$. Latit. abdominis lin. $2\frac{1}{2}$.

TAB. XXII. Fig. 9.

Habitat in Novâ Hollandiâ.

In Mus. nost.

DIPTERA (NEMOCERA). Fam. *Tipulidæ*.

Subfam. *Terricolæ*, Latr.

GYNOPLISTES,* Westw.

Ctenophoræ affinis. Rostrum (vel clypeus) capite brevius. Antennæ capite multo longiores, in utroque sexu supra pectinatæ ♂ 18, ♀ 17, articulatae. Abdomen ♀ depressum latum, apice acuminato, oviductu exserto acuto. Alarum nervi ut in *Ctenophorâ flavéolatâ* dispositi.

Insecta *Australasiæ* indigena.

Sectio prima. Antennæ ♂ graciles, singulo articulorum 3—17 ramum longum gracilem supernè emittente.

Sp. 1. *Gyn. nervosa*, Westw.

♂ Fusco-nigra; abdomine subrufescente, margine postico segmen-

* Ὅπισθεν retro, et πλατύς planus.

† Γυνή mulier, et οπλιστής armatus.

torum pallido, apice (ano) obscuriore; alis pallidè fuscis, nervis, maculâ parvâ anticâ centrali alterâque pone medium obliquâ nigris; pedibus fuscis, femoribus basi pallidis.

Long. corp. ♂ lin. 6. Expans. alar. lin. 11.

TAB. XXII. Fig. 10. 11.

Habitat in Australasiâ.

In Mus. nost.

Sectio secunda. Corpus minus gracile. Antennæ ♂ paullo crassiores singulo articulorum 3—14 ramum supra emittente. Artículo 15mo supra acutè producto, reliquis simplicibus (Tab. XXII. Fig. 12.) Antennæ ♀ articulis 3—11 ramum breviorē emittente, articulo 12mo sequentibus crassiori, articulo 17mo. 16mo. longiore, ovato. (TAB. XXII. Fig. 13.)

Sp. 2. *Gyn. variegata*, Westw.

Nigra; abdomine (nisi apice), alarum, femorum, tibiærumque basi fulvis; alis pallidis, apice fasciisque tribus transversis nigris marginem posticum haud attingentibus, anticè et in medio; alæ lineis duabus nigris longitudinalibus, unâ costali, alterâ centrali conjunctis.

Long. corp. ♂. lin. $4\frac{1}{2}$. ♀, (oviductu incluso) lin. $5\frac{1}{2}$. Expans. alarum ♂ lin. 7. ♀ lin. 11.

TAB. XXII. Fig. 12. Antenna ♂. Fig. 13. Antenna ♀.

Habitat in Australasiâ.

In Mus. nost.

PTILOGYNA,* Westw.

Tipulæ affinis. Rostrum capiti æquè longum. Antennæ ♂ 13-articulatæ, articulo 3tio ramum unicum e basi emittente; articulis 4 ad 9 ramos duos longos e basi, alterumque e medio paullo breviorē emittentibus; 10mo longo, ramis duobus basalibus alteroque brevi fere apicali; 11 ad 13 brevibus simplicibus: ♀ 14-articulatæ, thoracis vix longitudine, graciles, articulo 1mo crasso, 3tio ad apicem infra producto, singulo articulorum 4 ad 10 ramos duos ad basin emittente, ramo externo quam articulum ipsum paullo longiore, interno breviorē, articulis 4 terminalibus

* Πτελον penna, et γυνή mulier.

simplicibus. (Tab. XXII. Fig. 15. antenna ♀). Alæ (Fig 14.) cellulâ discoideâ subapicali 7-angulatâ nervis fere ut in *Limnobia bisulcatâ* Schum., dispositis. (Vide Schill. Beitr. t. 1. Dipt. f. 3. A.)

Sp. 1. *Ptil. marginalis*, Westw.

Fusca; capite, antennarum basi, thorace posticè, præsertim in ♂, segmentorum abdominalium lateribus, femoribusque (nisi apice) fulvis; alis ad costam dimidiato-fuscis maculis duabus parvis ante medium alterisque duabus apicalibus pallidis, nervis (nisi internis) fusco-nubilis.

Long. corp. ♀. lin. $11\frac{1}{2}$. Exp. alar. lin. $18\frac{1}{2}$. Mas paullo minor.

TAB. XXII. Fig. 14. 15. ♀

Habitat in Australasiâ.

In Mus. nost. ♂ ♀.

OZOCERA,* Westw.

Limnobia affinis. Alarum nervi ut in *Gynopliste nervosâ* (fig. 10) dispositi. Antennæ thorace longiores, 32-articulatæ; articulis 3tio ad 31mum inclusis ramulum longissimum gracilem pilosum e basi emittentibus (Fig. 5). Oculi ♂ maximi internè lunati subtus fere conniventes. Palpi perbreves, 3-articulati, articulo 1mo minuto, 2do majore subovato, 3tio paullo majore spatuliformi. Thorax ovato-rotundatus. Abdomen ♂ longum cylindricum, unguibus duobus terminatum.

The insect forming this genus exceeds all the other pectinated *Tipulidæ* in the great number of the ramose joints of the antennæ.

Sp. 1. *Oz. interrupta*, Westw.

Pallidè ochracea, thorace subobscuriore; oculis nigris; antennarum ramulis pallidè fuscis; alis pallidis nervis subfuscis, lineâ gracili interruptâ cinereâ per areolam elongatam subcostalem (cum asterisco notatâ in Fig. 10.) currente.

Long. corp. lin. 10. Expans. alar. lin. 16.

TAB. XXII. Fig. 5. Antenna.

Habitat in Australasiâ, apud "Swan River."

In Mus. Dom. Hope.

* Οζος ramus, et κερας cornu.

HEMICTEINA,* Westw.

Tipulæ affinis. Rostrum capiti æquè longum. Palpi articulo ultimo præcedente quadruplo longiore, annulatissimo. Antennæ ♂ graciles, 13-articulatæ, thoracis longitudine, singulo articulorum 4-9 ramum subtus emittente, articulum longitudine æquante; articulis 10-13 longioribus, simplicibus, gracillimis. (TAB. XXII. Fig. 17.) Alæ areolâ discoideâ, subapicali, 6-angulatâ, posticè nervos 4 simplices emittente. (Fig. 16.) Abdomen ♂ elongatum, clavatum. Pedes omnes (præsertim tarsi) longissimi.

Sp. 1. *Hem. gracilis*, Westw.

♂ Fusco-ochracea; oculis nigris; rostro subfulvo; thorace subvittato; alis pallidè fusciscentibus, nervis obscurioribus; abdomine segmentis duobus apicalibus nigris, ano fulvescenti; pedibus unicoloribus, subfuscis.

Long. corp. ♂ lin: 10. Expans. alar. lin. 16.

TAB. XXII. Fig. 16. 17.

Habitat in Brasiiliâ.

In Mus. nost.

NOTA 1. Congenerica est, at species minor, pedibusque forsan brevioribus, *Tipula pectinata*, Wied., "ochracea, thorace vittato, antennis "pectinatis, alis flavidis." Long. corp. ♂ 8 lin. "Beine lang, "ochrebraun, gegen die spitze hin allmahlig gesattiger". De affinitatibus hujus insecti cel. Wiedemannus observat "Die art stehet "zwischen mehreren gattungen mitten inne; in den viergliederigen "tastern steht sie bei den *Limnobiis*, in dem kammförmigen fühlern "vom vierten bis zum neunten gliede sind sechs lang stark abwärts "gerichtete der wurzel jedes gliedes eingefugte zähne dem *Ctenophoris*, "in der fuhlergliederzahl der Richtung und dem aderverlaufe dem "*Tipulis* am nächsten." Aussereur. Zweifl. Ins. Vol. 1, p. 47.

NOTA 2. A speciebus cæteris (vere Tipulideis) longipedalibus ab auctoribus descriptis, species nostra differt: scil. *Limnobia longimana*, Fab., tarsorum anticorum apicem album habet; *Tipula longipes*, Fab., pedes albo annulatos apicibus albis; *Tipula breviventris*, Wied., tibias

* Ημι semi, et κτένιον pecten.

basi albas possidet; *Polymera hirticornis*, Wied., Fab. (*Chironomus*)
antennis 28-articulatis verticillatis gaudet. *Leptotarsus Macquartii*,
Guer., Voy. Coq. Ins. pl. 20, fig. 1., abdomen fulvum nigro maculatum
antennasque (e figurâ) 10-articulas simplices habet. *Dolichopeza**
sylvicola, Curt., antennis 12-articulatis cellulâque discoidali subapicali
nullâ gaudet.

MEGISTOCERA, Wied.

Meg. dimidiata, Westw.

Ochracea; ano obscuro; antennis longissimis fuscis basi fulvis; femoribus
tibiisque ad apicem obscuris; alis hyalinis costâ latâ luteo-fuscanti;
abdomine abbreviato; ♀ antennis brevibus 13-articulatis.

Expans. alarum, lin. 16.

Habitat in Australasiâ.

In Mus. nost.

Ctenophora lata, Fab.

Hæc species, Indiam orientalem habitans, sectionem peculiarem in
genere *Ctenophora* constituit. In specimine Fabriciano caput deest.
Specimen maris in manibus teneo, a Dom. Sykes in Indiâ captum; quod
antennas valdè plumosas exhibet, singulo articulo exceptis articulis basa-
libus apicalique ramos 4 scil. 2 utriusque lateris emittente, omnes longi-
tudine æquales.

LEPIDOPTERA. (NOCTURNA.) Fam. *Pyrallidæ*.

ACRONOLEPIA,† Westw.

Antennæ fere ad apicem squamoso-dilatatæ ut in genere nostro *Desmia*
at non geniculatæ, apiceque ipso simplici, (TAB. XXII. fig. 18.) Palpi
capite vix longiores apice attenuati. Proboscis (maxillæ) longa.
Corpus mediocre, abdomine ultra marginem posticum alarum inferiorum
haud protenso. Coxæ anticæ valdè elongatæ, femora ardua brevissima.

* Hoc genus a cel. Curtisio propositum est anno 1825. Meigenius in tomo 6to
operis ejus, 1830, tab. 65, insectum idem figuravit sub nomine "*Leptina*" at in
descriptione suâ *Dolichopezam* appellavit, absque ullâ notâ operi Curtisii
referente.

† 'Ακρόνον summa pars, et λεπιδε squama.

Alæ posticæ subrotundatæ.

The remarkable structure of the antennæ distinguishes the insect composing this genus from every other with which I am acquainted.

Sp. 1. *Acr. quadricolor*, Westw.

Nigro-fuscus; alis superioribus fuscis, plagâ parvâ basali purpureâ, maculâ parvâ sulphureâ rotundatâ marginis interni terminatis; alis inferioribus fulvis, limbo externo fusco.

Expans. alarum lin. 11.

Habitat in Brasiliâ.

In Mus. nost.

Ordo ———? Fam. *Coccidæ*.

MONOPHLEBA Leach, MSS. Latr. Règne An. Edit. 2da. vol. 5, p. 233.

Antennæ ♂ corpore longiores, graciles, submoniliformes, 26-articulatæ, verticillato-pilosæ. Oculi magni, laterales, rotundati, compositi. Abdomen ovale, planum, segmentis 5 ultimis ramum pilosum utrinque emittentibus.

Mon. Leachii, Westw.

Piceo-nigra; abdomine prothoraceque fusco-carneis; scutello albido; alis fusco-nigris, lineis duabus longitudinalibus gracillimis albis.

Long. corp. (absque ramis abdominalibus) lin. $3\frac{1}{2}$. Long. rami ultimi lin. 1. Long. antenn. lin. 4. Expans. alarum lin. 8.

Habitat in Javâ, Malabariâ.

In Mus. nost.

ARACHNIDA. PULMONARIA. DIMEROSOMATA.

Fam. *Epeiridæ*.

PHORONCIDIA,* Westw.

Epeiris cancriformibus affinis. Cephalothorax fere semiglobosus lævis, anticè in tuberculum magnum productus, in quo insident oculi, scil., tres utrinque in margine tuberculi, alterique duo majores verticales. Abdomen magnum basi truncatum, cephalothoracis latitudine; posticè rotundato-dilatatum, depresso-concavum, maculis irregularibus spira-

* φορος ferens, et ογκος tumor.

culiformibus obtectum, lateribus spinis 3 longissimis acutis utrinque armatis, anoque inferè producto obtuso. Pedum 1 et 4 paria longiora, tunc par 2dum, tunc 3um.

Sp. 1. *Phor. aculeata*, Westw.

Picea nitida; abdominis disco rufescente, marginibus spinisque nigris maculis duabus basalibus marginalibus utrinque albis; apice palporum ♂ subfulvo.

Long. corp. lin. 2.

TAB. XXII. Fig. 19.

Habitat in Malabariâ.

In Mus. nost.

ARACHNIDA. ADELARTHROSOMATA. Westw.

Fam. *Phalangiidæ*.

TROGULUS, Latr.

Trog. Templetonii, Westw.

Trogulo bicarinato, Latr., major, et pro magnitudine paullo angustior, etiam colore albidior; femoribus anticis ad basin internè dilatatis et irregulariter obtusè dentatis; tarsis anticis apice articuli 1mi haud externè producto; palpis filiformibus mandibulis paullo brevioribus, 5-articulati, articulo 1mo brevissimo, 2do 4toque longitudine æqualibus longis, 3tio quam 1mum vix longiore, 5to quam 4tum paullo brevior.

Long. corp. lin. 6.

Habitat in Valparaiso.

In Mus. Soc. Hist. Nat. Belfast.

In honorem Dom. Roberti Templetonii Arachnologo Hibernici peritissimi hanc speciem nominavi.

ART. LXI. *On a remarkable sexual peculiarity exhibited by the Ear-wig, (Forficula auricularia, Linn.)* By J. O. WESTWOOD, Esq., F.L.S., &c.

Sir,

May I be allowed space for a remark or two in explanation of an observation of mine contained in the last Number of this Journal which may have had somewhat of the appearance of an act of injustice towards the celebrated French entomologist M. Leon Dufour.

In noticing the erroneous nature of the decapod annulose theory, I instanced the Ear-wig as a proof of the hexapod structure of insects, that species having the abdomen composed of nine distinct segments, adding that M. Dufour had unfortunately represented the abdomen with only seven segments, (Ann. Sc. Nat. 13, pl. 19, f. 2 A.) the two basal ones being omitted.

Being anxious a short time since to ascertain the situation of the spiracles along the body of an insect in which all the thirteen segments were fully developed in the perfect state, (in the hopes of discovering a clue to the solution of the remarkable question raised by the French entomologists relative to the structure of the Hymenopterous thorax, also noticed in my observations contained in the last Number of this Journal), I caught some Ear-wigs, in each of which I was not a little surprized to find that only seven abdominal segments existed; fearful that I had erred in my previous remarks I immediately re-examined my dissections in which nine distinct abdominal segments were clearly observable. On again looking at my live Ear-wigs they all proved to be females, whilst my dissected specimens were males. Here then we have the remarkable fact unnoticed by Latreille, Dufour, &c. that the male Ear-wig has two more abdominal segments than the female, and hence the correctness both of M. Dufour's figure, (at least if taken from a female, which however by no means appears from his "Explication des planches,") as well as of my own observations.

This circumstance is not a little interesting in reference to the develop-

ment or loss of certain segments of the *Annulosa* in the larva and perfect states, and one which from the great abundance of the insect in question may, by a careful examination of its structure in the different periods of its life, be advantageously employed in settling the doubts at present existing upon the subject. The abdomen in many instances is composed of one more joint in the male than in the female insects, (as in the normal *Hymenoptera*, &c.) where the former have seven, and the latter six segments; but in *Dytiscus* the reverse takes place, the female having eight, and the male only seven. In the Ear-wig however there is this peculiarity, viz. that in the perfect state of one sex (the male,) the abdomen is developed to the greatest possible extent, as to the number of its segments, and that two of these segments are lost in the opposite or female sex: the terminal segment in both being moreover perfectly alike, leading to the supposition that the lost segments are basal and not apical ones as has been generally supposed, such obsolete apical segments having been considered as employed in the construction of the ovipositor.

I am, Sir,

Your very obedient Servant,

J. O. WESTWOOD.

The Grove, Hammersmith.

October 22nd, 1833.

ART. LXII. *On Pentatremites orbicularis, acuta, and pentangularis.* By G. B. SOWERBY, F.L.S., &c.

In two former papers* I have described what I suppose to constitute eight distinct species of *Pentatremites*. Three others having since been discovered by Mr. Gilbertson, he was induced by the expressed wish of some friends to science, to forward descriptions of and observations on them for publication in this Journal. By some unaccountable accident his paper has been mislaid, and it becomes necessary, in order to complete the subject as fully as possible, that I should here add the characters of these three species. And I beg permission to subjoin a note or two which I find accompanying the drawings with which my brother will illustrate this and the last-cited paper.

The first of these notes is as follows, “the ambulacra are composed of two rows of bones placed in two furrows by the sides of an angular ridge, and so articulated as to leave a pore between each; these bones often fall off: the pores continue into the edge of the furrows.”

The other note is “there were two specimens of *P. elliptica* showing pores for respiration in the ambulacra; these pores are connected with passages that lead to what are called the ovaries.”

PENTATREMATITES ORBICULARIS.

P. globosa, ferè circularis. *Scapulares* mediocres, usque ad dimidium attingentes, emarginationis interscapularis angulo obtusissimo. *Interscapulares* majores. *Ambulacra* linearia, angusta, ad basin prominula.

TAB. SUPPL. XXXIII, fig. 5.

PENTATREMATITES ACUTA.

P. pyriformis, pentagonalis, supernè lata, infrà attenuata. *Ambulacra* brevia, lata, angulis supernè conspicuis.

* Vol. II., p. 313, and Vol. IV., p. 89.

TAB. SUPPL. XXXIII, fig. 6.

- a. Small bones or arms in the Ambulacra.
- b. Ridges to which the bones *a* are affixed.
- c. The ridges removed, leaving a striated surface.

PENTATREMITES PENTANGULARIS.

P. oblonga, supernè latior, quinquangularis, ambulacris brevibus, angulis obtusis.

Syn. *Platycrinites pentangularis*, Müller, (the arms being imaginary in his figure).

TAB. SUPPL. XXXIII, fig. 7.

I regret that it is not in my power, owing to the length of time that has elapsed since the descriptions of former species were drawn up, to point out more in detail the distinguishing characters of these species; I cannot however doubt that by careful attention to the plate and the characters above described, every difficulty will be removed.

References to TAB. SUPPL. XXXIII.

- Fig. 1. *Pentatremites angulata*. Zool. Journ., vol. IV., p. 89.
- a. Lateral view.
 - b. Base.
2. *Pentatremites inflata*, two views taken from different specimens. Zool. Journ., vol. IV., p. 90.
3. *Pentatremites oblonga*. Zool. Journ., vol. IV., p. 90.
4. *Pentatremites oblonga*, var.
5. *Pentatremites orbicularis*.
- a. Lateral view.
 - b. Apex.
6. *Pentatremites acuta*, two views.
7. *Pentatremites pentangularis*.
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ART. LXIII. *Conchological Notices ; chiefly relating to the Land and Fresh-water Shells of the Gangetic Provinces of Hindoostan. By W. H. BENSON, Esq., of the Bengal Civil Service.*

Genus NANINA, Gray.*

Testa heliciformis, umbilicata, peritremate acuto non reflexo.

Animal citò repens. *Corpus* reticulosum, elongatum. *Pallium* amplum, foramine communi magno perforatum, peritrema amplexans; processibus duobus transversè rugosis (quasi articulatis) omni latere mobilibus instructum; unico prope testæ aperturæ angulum superiorem exoriente, altero apud periphæriam testæ. *Os* anticum inter tentacula inferiora hians; labia radiato-plicata. *Tentacula* superiora elongata, punctum percipiens tumore oblongo situm gerentia. *Penis* prægrandis, antrum cervicis elongatum latere dextro et prope tentacula situm. *Solea* complanata, pedis lateribus æquans. *Cauda* tentaculata; tentaculum sub-retractile, glandulâ ad basin positâ humorem viscidum (animale attractato) exsudante.

This animal appears to be intermediate between the genera *Stenopus* of Guilding and *Helicolimax* of De Férussac. To the former it is allied by its tentaculated and pervious posterior extremity. In the form of its shell it resembles *Stenopus*, while the mantle reverted over the lip of the shell, and its lubricating processes, shew an approach on the other side to *Helicolimax*. It differs from *Stenopus* in having its sole the whole breadth of the foot, while it again resembles it, and thereby differs from *Helicolimax*, in having very long superior tentacula. Like *Stenopus* the animal in moist weather is rarely retracted within the shell, the foot

* The peculiar form of the animal of this genus had long since induced me to regard it as constituting a distinct group, to which I had, in my MSS., assigned the name of *Tanychlamys*. On submitting specimens, however, to the Zoological Society at one of its late Meetings, I find that I have been anticipated by Mr. Gray, who had just previously proposed for it the name which I have adopted above.

swelling so much that if it is suddenly thrown into boiling water, the attempt to return into the shell invariably causes a fracture of the aperture. Drought, however, effects its retraction gradually, and it then covers itself with a whitish false operculum, similar to those of other *Helices*. The shell itself differs in nothing but superior size from the common little *Helix lucida* of Europe. The animal is dark brownish with the exception of the sole and the posterior extremity, which are livid. The colour of the animal seen through the polished diaphanous brown shell has a very rich appearance.

Besides the narrow edge of the mantle which is reflected over the sharp edge of the aperture forming a fold on the outer surface, two processes are projected over the shell; one of them is thrown off at the upper angle of the aperture, near the foramen commune, the other at the periphery; both are extensible, corrugated, and flexible in every direction, the upper one reaching, when extended, beyond the apex of the shell. They are continually in motion and exude a liquor which lubricates the shell, supplying, apparently, that fine gloss which is observable in all recent specimens. There is an orifice under the posterior caudiform appendage in the form of an isosceles triangle with the apex downwards, whence a thick greenish juice exudes when the animal is handled or irritated, the caudal appendage being turned up and protruded towards the exciting object. This appendage much resembles the anal horn of the *Sphynx* caterpillars. One of the largest specimens which I have seen was much injured by being repeatedly dropped by a gentleman who discovered it crawling on a rock, and who was deterred by the threatening appearance of the tail, which he imagined might contain a sting, and with which it endeavoured to reach his finger when seized. The motions of the animal are quick as compared with those of its congeners, and like *Helicolimax* it only crawls the faster when disturbed, instead of retracting its tentacula. It carries the shell horizontally or nearly so, while in *Helix* the axis of the shells forms a very large angle with the horizon.

It deposited much excrement in long curled rolls which were brown when the animal was newly captured, but when fed on the leaves of an

Argyreia and of an *Ipomæa* (on which it banqueted voraciously, and which it could not have met with in its natural haunts,) it became greenish. When the excrement is emitted the head is withdrawn into the shell, the orifice in the mantle being exposed, whence the excrement falls over the foot, and the animal coming out immediately, it is passed by the action of the muscles under the sole to the posterior extremity, where it is finally quitted.

The corrugations of the upper part of the foot are parallel to each other and elegantly disposed; near the base they are discontinued, and are bounded by an impressed line and a ridge parallel with the edge of the sole. The motion of the heart is distinctly visible in the pericardium while the animal is crawling. The antrum penis is situated nearer to the head than in *Stenopus cruentatus*, forming an equilateral triangle with the bases of the upper and lower tentacula on the right side of the neck: the generative organ is retort-shaped and hyaline. The animal is hermaphrodite and may be found in reciprocal copulation like the snail. The pulmonary cavity occupies about half the last whorl when the animal is in motion, and the ramifying vessels of its coat are visible through the shell; beyond it lies what appears to be the liver, of a dark brown colour, lengthened out towards the spire. The tumid part of the superior tentacula is elongate, not globular, as in *Helix aspersa*, &c.

Though the dead specimens of the shell are not unfrequent in uncultivated places of the Gangetic plain, from Calcutta to Cawnpore, I sought in vain during six years for live specimens until I discovered six congregated together on the prone face of a projecting rock on the summit of the great pile of Syenitic boulders at Banda in Bundelkhund, where they were protected by a screen of verdure which secured a damp atmosphere within. This was in the rainy season, and the animals were alert and copulating. I subsequently received a specimen from the Hill Fort of Callinger, and I afterwards discovered a collection of them laid up in their dry-season quarters, and protected by their false opercula, in the crevices of ruinous masonry in the old fort at Rigmahal on the Ganges.

In 1832 I brought to England specimens of these snails, some of which continued alive from December 1831, when I took them, until

the summer of 1833, when the last of them died.

HELIX INTERRUPTA, *Bens.*

Hel. testâ sinistrorsâ, orbiculato-convexâ, infrâ tumidâ, umbilicatâ, ad peripheriam obtusè angulatâ, longitudinaliter confertissimè striatâ, suprâ striis interruptis fasciis transversalibus dispositis; spirâ apice obtusâ; peristomate tenui acuto.

Hab. in rupibus umbrosis Sicrigali et prope Gangis ostiorum fluvium Jellinghy dictam.

This shell has been thought to belong to the species called *Helix Himalayana* by Mr. Lea (*Hel. lævipes?*), but appears to me to be very different when compared with the following characters of a specimen of the latter in my possession.

HELIX HIMALAYANA, *Lea.*

Hel. testâ sinistrorsâ, orbiculato-convexâ, longitudinaliter rugosâ, suprâ interstitiis rugarum corrugatis, infrâ transversè rugosulis, tumidâ, umbilicatâ: fulvâ fasciis plurimis castaneis, majore infrâ peripheriam; periphæriâ subangulatâ; labro reflexo, albo.

The spire is less exerted in this species than in *Hel. interrupta*, the peculiar sculpture of which forms the best distinctive character.

The angulated periphery in *Hel. interrupta* shews an approach to *Carocolla*, the animal of which, I conclude from the silence of observers, differs in nothing from that of *Helix*; whereas that of *Hel. interrupta* differs most materially, the excrements being voided from an opening in the terminal and posterior part of the foot instead of from the foramen commune!

The following is a description of the animal taken while I had the live specimens in my possession.

Tentacula duo superiora elongata capitulis tumidis oculiferis (puncta percipientia gerentibus), duo inferiora capitulis parvis tumidis. Pes elongatus, compressus, marginatus, suprâ granulatus, aperturâ terminali anum et membrum carnosum mucorem emittentem continente.

PTEROCYCLOS BILABIATUS, *Bens.*

In the first number of the Journal of the Asiatic Society of Calcutta (January, 1832,) I described under the name of *Pterocyclos* a genus allied to *Cyclostoma*, and remarkable on account of the outer lip of the shell being separated at its upper part from the body of the penultimate volution, outside of which it rises vertically, somewhat in the shape of a wing.

Since my arrival in England I have satisfied myself by the inspection of Mr. G. B. Sowerby's specimens, that his *Cyclostoma bilabiatum* is the same shell at a more advanced period of growth; when, in addition to the notch and over-hanging wing at the upper part of the aperture, the peristome becomes thickened and sinuated. Mr. Sowerby's specimens were from Salem in the Madras Presidency; mine were met with at Sicrigully, a pass between the hills and the River Ganges, in Bahár.

I am indebted to Mr. Sowerby for a specimen of *Cyclostoma Petiverianum*, Gray, and for the observation that it exhibits an approach to *Pterocyclos* in the crude formation of a wing at the upper part of the right lip.

CYCLOSTOMA INVOLVULUS, *Gray*, MS.

I found this beautiful species alive on the rocks of Sicrigully, and among loose brick rubbish and under felled timber, in the fort of Rajmahal in Bahár on the 16th December, 1830. I also procured dead shells from the rocks of Patharghátá. It appears to be very plentiful in all these situations. I never met with it to the westward, either in the plains or among the rocks or hills of the Vindhyan ranges which border those plains to the southward. I have seen a worn specimen in a collection of shells made 22 or 23 years ago in Ceylon.

The young shell being destitute of the thickened and continuous peristome, as well as of the rich orange colour which adorns that part, might, if met with destitute of an inhabitant, be easily mistaken for a *Helix*. The peristome when first reflected is also free from the orange colour, which it does not acquire until thickened and fully grown.

In its exterior anatomy the animal differs from that of *Cyc. elegans*,

as described by the Rev. Mr. Berkeley in the Zoological Journal, only in the following particulars. The foot has an oblong-ovate disk somewhat pointed behind, instead of an oval one pointed before and behind. The summits of the tentacula are not inflated, and are translucent instead of being opaque. The edge of the mantle is even, not crenulated. Lastly the operculum is horny, not testaceous, and consists of many volutions instead of three, differing in the manner of construction from that of *Cyc. elegans* as much as that of *Littorina* does from the operculum of *Trochus*.

Like the cognate genus *Helicina* the animal uses its tentacula alternately to examine its path by means of the sense of touch.

The colour of the animal is livid, with some dark olive shades. The tentacula are blackish-olive with the exception of the translucent summits.

ASSIMINIA FASCIATA, *Bens.**

Ass. testâ ovato-conicâ, arctè umbilicatâ; rubro, albo, glaucoque utplurimum fasciatâ.

On December 25th, 1832, I discovered on the steps of a Ghaut or landing place, opposise to Barrackpore, hundreds of specimens of a living shell, which I, at the time, supposed to be a new genus, but which I have since ascertained to belong to Dr. Leach's genus *Assiminia*. The specimens adhered to the steps between high and low water mark, within the influence of the tides, and subject to the influx of brackish water in the dry season, the brackishness being only overcome by the strength of the freshes in the rainy season.

Shell ovate-conical, narrowly umbilicated, differing from *Paludina* in having a closely adhering columellar plate interposed between the two lips of the aperture, and in having a spiral operculum (like *Melania*) instead of a concentric lamellar one. Aperture entire, oblong-oval, angular at the upper part.

Animal. Head with only two short, thick, subcylindrical tentacula, with the percipient points placed at their summits. Snout like that of *Paludina*, transversely corrugated, and bilobed, or rather emarginate

* *Turbo Francesii*, *Gray*, in Wood's Suppl.

at the centre of the extremity, the lobes rounded. Mantle free, and branchial cavity open. Foot with a spiral horny operculum angular at the upper part.

The specimens varied infinitely in colour, and were for the most part banded with red, white, and glaucous.

I met with a few specimens on the Ghauts at Calcutta, sixteen miles lower down the river.

I preserved specimens alive in a glass replenished occasionally with fresh or sea water, until April, 1833, when we had passed St. Helena. The strong ones crawled out of the water, and adhered to the glass above the margin of the liquid.

Genus NOVACULINA, *Bens.*

I was much pleased during a recent visit to Dublin, at meeting with a second species of the genus *Novaculina*, founded by me in the *Gleanings in Science of Calcutta*, (No. 14, for February, 1830,) on a single species *Nov. Gangetica*, met with in the several rivers of the Gangetic tract, and especially interesting as a *Solenaceans* genus inhabiting fresh water. The species in question I procured from Mr. Glennon of Suffolk Street, who informed me that it had been recently brought from Indiana, U. S. In its generic character it agrees with the Asiatic shell to which it is superior in size. It differs specifically in the following instances.

The posterior or syphonal and ligamental side is the shorter, and the teeth are situated on the longer side of the shell; while in the Asiatic species the syphonal and ligamental side is the longer, and the teeth are on the shorter side. The callus which borders the ligamental canal is also much thicker, comparatively, in the American species, having to support a very strong ligament. My specimen has two teeth in each valve, and the syphonal scar is equally long with that of *Nov. Gangetica*. The remains of the epidermis on the edge of the shell shew that, in this species also, it projects beyond the basal and cardinal edges.

Genus SCAPHULA, *Bens.*

My first specimens were found in the rainy season of 1826 in the bed

of the Jumna at Humeerpore in Bundelkhund, being left in the mud on the subsidence of that river. The first which was procured was very small, and was the most recent specimen met with, the valves being connected by the ligament, and traces of the epidermis being visible. Repeated searches failed to procure me more recent specimens, or any other than a single valve of a larger size.

In 1830, I procured several single valves from the sandy bed of the river Cane, under the fort of Bhooraghur, near Banda, Southern Division of Bundelkhund.

The form of the shell, its lozenge-shaped ligamental scar, and the position and order of its teeth shew its place to be among the *Arcaceæ*: while the oblique production of the teeth on the posterior side down the inner surface of the cardinal lamina, the separation of the teeth into two sets by the interposition of an edentate portion of the cardinal lamina, and the freedom of the shell from ribs, with the exception of the ridges which occur at the angle of the shell, will suffice to distinguish our shell from the genus *Arca*, which will still comprehend marine shells only.

The term *Scaphula*, while it expresses its diminutive size in comparison with some of the gigantic species of *Arca*, will serve to point out its affinity to that genus, and may perhaps be adopted to distinguish the genus should a better one not have been already proposed.

CERITHIUM TELESCOPIUM, Brug.

THE possibility of importing from other countries, and especially from the warmer latitudes, the animals which construct the innumerable testaceous productions that adorn our cabinets and museums, the accurate knowledge of which is so necessary to enable the conchologist rightly to arrange this beautiful department of nature, must be an interesting subject to every naturalist, and will render no apology necessary for the following notices extracted from my Journal. Their publicity may incite others who may have opportunities of trying the experiment to follow the example.

January, 1832. Observed near the banks of the canal leading from

the eastern suburb of Calcutta to the Salt Lake at Balliaghat, heaps of a *Cardita* with longitudinal ribs, of a large and thick *Cyrena*, and of *Cerithium Telescopium*, exposed to the heat of the sun for the purpose of effecting the death and decay of the included animals previously to the reduction of the shells into lime.

Early in the month I took specimens of them, and leaving them for a night in fresh water I was surprised to find two *Cerithia* alive. I kept them during a fortnight in fresh water, and on the 22nd January carried them, packed up in cotton, on board a vessel bound for England. After we had been several days at sea, I placed them in a large open glass with salt water, in which they appeared unusually lively. I kept them thus, changing the water at intervals, until the 29th May, when we reached the English Channel; I then packed them up, as before, in a box, and carried them from Portsmouth to Cornwall, and thence to Dublin, which I did not reach until the 14th June; here they again got fresh supplies of sea water at intervals. One of them died during a temporary absence between the 30th June and 7th July, and on the 11th July the survivor was again committed to its prison and was taken to Cornwall, and thence to London, where it was delivered alive to Mr. G. B. Sowerby, on the 23rd July.

This animal had thus travelled during a period of six months over a vast extent of the surface of the globe, and had for a considerable portion of that time been unavoidably deprived of its native element.

It is this individual which has been dissected by the Rev. M. J. Berkeley and Mr. Hoffman, whose account of its anatomy is given at page 431 of the present Number.

ART. LXIV. *Analytical Notices of Books.*

Naturgeschichte der Säugethiere von Paraguay, &c. The Natural History of the Mammalia of Paraguay. By Dr. J. R. RENGGER. Basel, 1830. 8vo. pp. xvi, and 394.

THIS work may be regarded as a commentary and a supplement to that of D'Azara, whose deficiencies as a naturalist the authour points out in his preface, at the same time that he gives him his due praise for zeal, perseverance, and accuracy of observation. It was during a residence of six years in Paraguay, the difficulty of access to, or rather of return from, which has of late years thrown such an air of mystery over every thing connected with it, that Dr. Rengger collected the materials of the present publication. His usual place of abode was Asuncion, the metropolis of the country; but some months of every year were passed by him in visiting its less populous or wholly uninhabited districts, with the view of making himself acquainted with its natural history. In this pursuit he received considerable assistance from the companion of his journey Dr. Longchamp, and from Dr. Parlet, an Englishman who died in the neighbourhood of Asuncion, in the year 1824. His collections appear to have been very considerable, but the suspicions of Dr. Francia, the Dictator of Paraguay, rendered it impossible to transmit them to Europe, and the greater part consequently went to decay. When he at length received from the caprice of the Dictator permission to depart, only two hours were allowed to him for preparation, and he was consequently unable to bring away with him more than a small part of what still remained; the rest was confided to some trusty friends, but no tidings of them have since been obtained. His materials for a History of the Quadrupeds of Paraguay consist of descriptions taken on the spot from both living and dead individuals, frequently repeated in order to secure their accuracy; of written notes of their manners both at large and in captivity; of anatomical observations and drawings; and of

the entire skeletons and skulls which he was enabled to bring with him to Europe.

From these materials he has produced a very interesting volume, not merely to the scientific reader, but also to the world at large; adding as it does to very minute descriptions, and valuable discussions on the synonymy of the species, extensive details of their habits and modes of life, derived chiefly from personal observation. In this latter part of his subject, which renders his book as amusing as it is instructive, he frequently corrects his predecessor D'Azara, who appears to have relied more on accounts furnished by natives than is either safe or prudent.

The volume commences with the physical description of the native inhabitants of Paraguay, which the authour limits to the kind of peninsula formed by the rivers Paraguay and Parana, from their union as far North as 21° S. lat. Within this tract of country he has met with 68 species of *Mammalia*, which we shall proceed to enumerate, making a few observations on those which seem to require elucidation. Only three species of Monkeys are noticed: viz. 1. *Myctes Caraya*, Desm.; 2. *Cebus Azarae*, Rengg.; and 3. *Nyctipithecus trivirgatus*: the *Caraya*, *Cay*, and *Mirikina* of the natives. The first and last are now well known species; the second is meant to include all the varieties, as the authour considers them, of the Paraguayan species of *Cebus*. In corroboration of this opinion he describes numerous individuals varying greatly in the nature and intensity of their colouring, even in the same family; thus affording strong grounds of suspicion that the number of species in this genus has been greatly and unnecessarily augmented by the adoption of slight differences of colour as a sufficient ground of separation. The *Cheiroptera* observed are more numerous: they are 4. *Phyllostoma superciliatum*, Wied; 5. *Phyll. lineatum*, Geoff.; 6. *Phyll. infundibuliforme*, Rengg.; 7. *Phyll. Lilium*, Geoff.; 8. *Glossophaga villosa*, Rengg.; 9. *Vespertilio villosissima*, Geoff.; 10. *Vesp. nigricans*, Wied; 11. *Molossus laticaulatus*, Geoff.; 12. *Mol. cæcus*, Rengg.; 13. *Mol. crassicaudatus*, Geoff.; 14. *Mol. castaneus*, Geoff.; 15. *Noctilio dorsatus*, Wied; and 16. *Noct. ruber*,

Rengg. Of these No. 6 is stated to bear a close resemblance to D'Azara's *Chauve-souris troisième*, admitted into scientific catalogues under the name of *Phyllostoma rotundum*. It differs, however, according to the authour, from the description of the latter given by D'Azara, in the form of the nasal membrane; although on a comparison of the two descriptions we do not clearly perceive in what the difference actually consists. Unfortunately neither D'Azara nor Dr. Rengger furnish us with specific characters; and we can consequently do little more with the new species established by the writer now before us than refer to his descriptions, in the attempt to abstract which we might lose sight of the most essential characters. His *Glossophaga villosa* appears to have remained hitherto unnoticed; but his *Molossus cæcus* is identical with the *Chauve-souris neuvième* of D'Azara, and his *Noctilio ruber* is the *Chauve-souris onzième* of the same authour, removed from *Vespertilio*, in which it had hitherto been mistakenly placed, to *Noctilio* of which it has all the characters.

The *Plantigrade Carnivora* observed by Dr. Rengger in Paraguay are the following: 17. *Nasua socialis*, Wied, (*Cuati* of the natives); 18. *Nas. solitaria*, Wied, (*Cuati mondé*); 19. *Procyon cancrivorus*, Geoff., (*Aguarapope*); 20. *Gulo Barbarus*, Desm.; and 21. *Gulo vittatus*, Desm., (both called *Yaguape*). With the exception of the Otter of the country, all the *Digitigrada* belong to the genera *Canis* and *Felis*. The Otter is distinguished from the *Lutra Brasiliensis*, Ray, under the name of 22. *L. Paranensis*, Rengg. The differences are stated to consist in the want, (in the latter species), of the white or yellowish longitudinal stripes on the under part of the neck, and of the reddish yellow spot on the breast, which are characteristic of the former. It has besides only four, instead of five, cheek teeth on each side of the upper jaw; and seems never to attain the large size of full grown specimens of the Brazilian species, no individual seen by the authour having measured more than four feet in total length. It is added, on the authority of D'Azara, that the tip of the tail in full grown females is white. The Wolf, 23. *Canis jubatus*, Desm., (*Aguaraguazu* and *Yagua pyta*); the Fox, 24. *Can. Azaræ*, s. *Brasiliensis*, Wied, (*Aguarachay*); and 25. the different varieties of the *Can. domesticus*, s. *familiaris*, L.

are all the canine animals noticed. The authour fully agrees with Prince Maximilian that the Fox is distinct from the *Can. cinereo-argentatus* of North America. Six species of Cats, besides the domestic, form a formidable list of purely predaceous quadrupeds. They are 26. *Felis Onça*, L., (*Yaguar*); 27. *Fel. concolor*, L., (*Guazuara*); 28. *Fel. Pardalis*, L., (*Chibiguazu*); 29. *Fel. macroura*, Wied, of which Dr. Rengger saw only a mutilated specimen; 30. *Fel. Yaguarondi*, Desm., (*Eyrahuh*); 31. *Fel. Eyra*, Desm., (*Eyra-pyta*); and 32. *Fel. Catus domesticus*. L. No. 30. appears to be considered by our authour as peculiar to Paraguay, and as having been hitherto described by D'Azara only: we presume therefore that he excludes from this species the larger individuals from Surinam and Essequibo, which have been ascribed to it by M. Temminck and other writers. Both it and No. 31, which had certainly remained unnoticed except by D'Azara, are very fully described.

The *Marsupialia* comprehend only three species; a circumstance calculated to excite some surprise when we recollect that D'Azara describes twice that number. But it must be observed that the latter authour embraced in his work a much more extensive tract of country; and this may also account for the absence from the present publication of several other animals described by him. The species in question, all designated by the native name of *Micuré*, are: 33. *Didelphis Azaræ*, Temm.; 34. *Did. lanigera*, Desm.; and 35. *Did. crassicaudata*, Desm. There is much interesting information, which we regret that we have not space to analyze, relative to the mode of reproduction of these singular animals.

Of *Rodentia* we have thirteen species, of which four belong to the genus *Mus*. These are: 36. *Mus Anguya*, Desm.; 37. *Mus rufus*, Desm.; 38. *Mus callosus*, Rengg.; and 39. *Mus longitarsus*, Rengg. The two latter are described as new. No. 38 is said to be in appearance like a young *Mus Rattus*; but the bristles surrounding the mouth are much shorter, being scarcely six lines in length; the ears are oval, nine lines in height and six in breadth; the tail does not run out into a point, but ends abruptly, and is curved downwards; the claw of the rudimental thumb is perfectly flat; and there exist on the soles of the

anterior feet one pair, and on those of the posterior two pairs, of collateral, hard, elevated *calli*, which give name to the species. The *Mus ongitarsus*, on the other hand, might at first sight be confounded with the *Mus Musculus*; but it differs in having the bristles that surround the mouth longer, that is to say, measuring nearly an inch in length; in the length of its tail compared to that of its body being as 1.22 to 1, while in the latter it is only as 1.08; and in the hinder feet being much longer, their whole length being 14 lines, of which the *tarsi* constitute 9. The Old Continent pests with which these two species are compared have also found their way to Paraguay, having been introduced by Spanish vessels; they are now completely naturalized and extend their depredations to the plantations as well as the houses, but do not go far beyond the settlements of man, as the authour never met with them in unfrequented districts, or the isolated dwellings of the interior. Two species of *Echimy*s are enumerated, viz. 40. *Ech. spinosus*, Desm., and 41. *Ech. longicaudatus*, Rengg. The latter, a single individual of which was taken in the northern part of the country, differs but little from the preceding species, except in the length of its tail, which exceeds that of the body, while in *Ech. spinosus* it scarcely measures half as much. The variation in colour between the two is by no means striking. There is little that requires particular notice in the remaining *Rodentia*; they consist of 42. *Myopotamus Bonariensis*, Comm., (*Quiniya*); 43. *Sphingurus spinosus*, F. Cuv., (*Cuiy*); 44. *Lepus Brasiliensis*, L., (*Tapiti*); 45. *Calogenus Paca*, (but one species, the *Pay*); 46. *Chloromys Acuti*, F. Cuv., (*Acuti*); 47. *Hydrochærus Cuybára*, Erxl., (*Capiyguá*); and 48. *Cavia Aperea*, Gmel. With respect to the latter Dr. Rengger maintains that it is specifically distinct from the domesticated Guinea-pig, and gives many excellent reasons for his opinion, taken from important differences in structure, economy, and habits—differences so remarkable that it is difficult to believe that they could have arisen solely from domestication in a distant country.

The *Edentata* consist of five species of Armadillo, and two Ant-eaters, as follows: 49. *Dasyppus 6-cinctus*, L., (*Tatu-poyu*); 50. *Das. gymnurus*, Illig., (*Tatu-ay*); 51. *Das. 9-cinctus*, L., (*Tatu-hu*); 52.

Das. hybridus, Desm.; 53. *Das. giganteus*, Desm.; 54. *Myrmecophaga jubata*, L., (*Yurumi*); and 55. *Myrm. tridactyla*, L., (*Caguaré*). The *Pachydermata* are six in number: 56. *Tapir Americanus*, Gmel., (*Mborevi*); 57. *Dicotyles labiatus*, F. Cuv., (*Tagnicati*, which signifies *white-jaw*); 58. *Dic. torquatus*, F. Cuv., (*Taytetu*); 59. *Sus Scrofa*, L.; 60. *Equus Caballus* L.; and 61. *Equus Asinus*. Under the head of the Horse, the authour gives many interesting particulars relative to the half wild race, which has extended itself so wonderfully over the plains of this and the neighbouring parts of South America. Seven *Ruminantia* complete the catalogue: they are: 62. *Cervus paludosus*, Desm., (*Guazu-pucu*); 63. *Cerv. campestris*, F. Cuv., (*Guazu-y*); 64. *Cerv. rufus*, F. Cuv., (*Guazu-pyta*); 65. *Cerv. simplicicornis*, Illig., (*Guazu-vira*); 66. *Bos Taurus*, L.; 67. *Capra Ægagrus*, L.; and 68. *Ovis Aries*, L.

The volume is concluded by three Essays: on the Geographical Distribution of Quadrupeds in South America; on the phosphorescence of the eyes in certain species of *Mammalia*; and on the mode of measuring Quadrupeds. All these subjects are treated with considerable ability, and much scientific information; but we regret that we cannot afford space for their analysis. They add much to the value of this interesting work.

Nova Acta Physico-medica Academiæ Cæsareæ Leopoldino-Carolinæ Naturæ Curiosorum. Tomus xv.—Vratislaviæ et Ponnæ, 1831.

THE opening paper of the volume, by Gæthe, is chiefly interesting at the present day as affording a fresh instance of the ardour with which that great man entered, in early life, on the study of natural history, and of the philosophical spirit in which his investigations were conducted. It consists of an essay “Ueber den Zwischenkiefer des Menschen und Thiere,” written and prepared for the press in 1786, and of various supplemental additions relating to the circumstances under which it was composed, and to the state of the distinguished authour’s opinions on various points connected with his subject, at that early period. From the whole of these communications it is evident that the

doctrine of unity of composition, since so strenuously inculcated by many of his countrymen, and adopted by a large and increasing school in France and England, was maintained by Gæthe long before the close of the last century, not merely as a bold and speculative hypothesis, but as a theory resting on the detailed investigation of facts. Among these one of the most obvious, which forms the basis of the Memoir before us, was the existence in man, as well as in other *Mammalia*, of inter-maxillary bones, capable of ready demonstration, although at that time denied by the almost universal voice of human anatomists. The plates which accompany the Memoir exhibit a comparative view of these bones in the roebuck, the ox, the camel, the horse, the babyrussa, the lion, the polar bear, the wolf, the walruss, a monkey, and man; and prove how attentively and how successfully the youthful philosopher had studied the limited materials within his reach. It is unnecessary to enter into the details of a question on which no difference of opinion can any longer exist; but it may not be uninteresting to observe, in addition, that so early as the year 1791 Gæthe appears to have arrived at the conclusion that the bones of the head were reducible to six vertebræ, and that consequently the long agitated question as to the right of priority in this hypothesis is completely set at rest.

Dr. Barkow's paper "Ueber angeborenen Mangel des Unterkiefers bei Säugethieren," is an interesting addition to the history of monstrosity in the higher animals. It offers a detailed account of the external appearances and internal anatomy in two cases of congenital absence of the lower jaw in lambs, and compares these with the particulars of similar cases furnished by previous writers. The modifications in various parts of the structure of the animals coincident with this mal-formation are carefully described; and figures of the head, and of the separate parts, in different aspects, give a clear idea of the peculiarities observed. For the details of these, which are stated with great minuteness, the paper itself must be consulted.

Dr. Rosenthal's contributions "zur Anatomie der Seehunde" are interesting as the last labour of an excellent observer, whose anatomical researches, especially as regards the structure of fishes, are deserving of

the highest praise. In this anatomy of the *Seal*, it was hardly to be expected that he could add much of absolute novelty to what was previously known; but either the confirmation or the correction of the accredited statements by so practised an anatomist cannot be regarded with indifference. There is nothing, however, in the paper so strikingly new as to call for particular observation here. In common with most recent anatomists Dr. Rosenthal regards the closure of the *foramen ovale* and of the *ductus arteriosus* as the normal structure in these animals, and their occasional perviousness as an exception to the general rule. Figures of the heart, liver, mesenteric glands, lacteals, and female organs, accompany the paper.

Baron von Ockskay describes the "*Mus pratensis*" as a new species, inhabiting such situations only as are indicated by its trivial name, in the western parts of Hungary. He gives its specific character as follows; "*M. caudâ longitudine corporis; auriculis rotundatis, pilosis, vellere parùm prominulis; palmis tetradactylis cum pollice unguato; dorso ferrugineo, abdomine albo;*" and states that its body measures $2\frac{1}{2}$ inches in length, and 1 inch and 2 lines in height. According to the authour it is the most agile and vivacious of the genus, but exceedingly savage even in captivity; its ferocity being such that the female destroys and devours her young, and the male his mate. They live on the seeds and roots of grass and other herbaceous plants, and build their nests, among the herbage on the surface of the ground, of fragments of decayed grass. The female produces five or six young several times in the year.

Some "*Fernere Untersuchungen über Blutlauf in Kerfen,*" by Dr. Carus of Dresden, add much to the authour's previous discoveries with regard to the circulation of the blood in insects. As he has himself given a summary of the results of his observations on this most important subject, we cannot do better than translate that portion of his paper; observing that the conclusions which he regards as satisfactorily made out are designated by an asterisk, while those not so distinguished must be considered as more or less hypothetical.

"*1. The blood flows in the dorsal vessel from the abdomen towards the head.

“ *2. The dorsal vessel pulsates most strongly at its abdominal extremity; and although as a whole it corresponds to the idea of a heart, yet its lower portion (frequently much expanded) is that which more especially coincides with this idea.

“ *3. In the course of the dorsal vessel there are no special enlargements, nor any lateral ramifications of blood-vessels demonstrated either by anatomy or by the microscope.†

“ *4. The dorsal vessel is therefore truly a heart, that is to say, a *central organ* accelerating and regulating the circulation, and receiving and expelling the blood by means of primary vessels, but not itself ramifying immediately and from its sides into smaller vessels.

“ *5. The dorsal vessel receives the systemic blood at its abdominal extremity through venous apertures, and expels it at its termination near the head. This is proved partly by microscopic observations, in which the injection and expulsion (the latter, for example, in the head of *Lampyrus*) may be immediately seen, and partly by anatomical observations of the subdivision of the dorsal vessel at both extremities, as noticed by Mayer, Müller, and Schultz.

“ 6. The circulation of the blood in other parts of the body takes place partly without vessels in free streams, and partly in vessels. I regard this law, for the present, as hypothetical, because although it is certain that the blood, in the wings for example, circulates *through vessels*, it is not positively ascertained that in those parts of the body in which the microscope detects streams of blood, but recognizes no vascular *parietes*, the latter are actually wanting.

“ *7. As the current of the blood within the dorsal vessel is directed forwards towards the head, so without that vessel it is directed backwards towards the abdominal extremity.

“ 8. This circulation is probably only the further developement of a simple constant circular current, at first destitute of *parietes*, which

† In a note on this passage, Dr. Carus refers to the lateral apertures in the dorsal vessel, for the imbibition of the blood, (described by M. Straus-Durckheim, but not detected by Herold, Marcel de Serres, Meckel, Müller, or himself), which he seems unwilling to admit without further proof.

in the primary state of the insect (that is to say in the embryo within the egg) passes upwards towards the dorsal, and downwards towards the ventral surface; and may be regarded as analogous to the circulation in the separate joints of *Chara*.

“ 9. The developement or further evolution of this simple current probably takes place in such a manner that, continuing in opposite directions, the upper remains simple but has more dense canals, while the lower subdivides into several currents, which remain for the most part uncircumscribed by definite *parietes*.

“ *10. The currents of blood in all the external parts of insects are directed from the head downwards, and it is therefore observed that in the *antennæ*, upper joints of the legs, wings, &c., the current of blood through these parts, whether simple or branched, commences on the side directed towards the head, and flows back on the side directed towards the abdominal extremity; an observation from which alone, but more especially when taken in connection with the absence of lateral branches in the dorsal vessel (as demonstrated by anatomy), it results, that they are all lateral arcuations outward and ramifications of the laterally retrograde currents. In transparent *larvæ* we perceive moreover, with perfect distinctness, that the currents passing through the *branchiæ* and upper joints of the legs, are merely outward arcuations of the lateral descending streams.†

“ *11. The form of the globules of the blood in insects is very variable: they are larger or smaller, and sometimes appear to be entirely wanting. But as they are the only means by which the current is rendered visible under the microscope, it may be admitted that currents sometimes exist where, under the microscope, none are to be seen.

“ *12. The currents of the blood in insects may occur at different periods of time in very different degrees of extension in one and the same individual; with respect to which it needs only to be observed that the more external they are, the more readily do they admit of suspen-

† This circumstance is illustrated by a diagram of the entire circulation according to the views of the learned authour.

sion without interrupting the principal circulation. Thus we see the circulation of the wings going on in more or in fewer vessels; thus the currents in the *antennæ* and joints of the legs pass to a greater or less extent along those organs; and thus a certain degree of desiccation may take place in some perfect insects, by means of which the entire flow of blood is restricted within the circle in which it probably takes its origin, until at length even this vanishes, and death supervenes after a few successive oscillations of the heart."

Of three papers in systematic Entomology contained in the volume, the first, by Dr. J. L. T. F. Zincken Sonner, is entitled "Beitrag zur Insekten-Fauna von Java, Erste Abtheilung," and forms the commencement of a series of memoirs on the insects of Java, founded partly on materials contained in the authour's own collection, and partly on others submitted to his examination by Dr. Blume, and an unnamed correspondent. He seems to have been altogether unaware, although the date of the publication is in 1831, that a work on the same subject was in progress in this country, of which two numbers, containing a portion of the *Papilionidæ*, made their appearance in 1828 and 1829. It is consequently a somewhat singular coincidence that, in this first section, the genera of *Papilionidæ* selected for illustration (the arrangement adopted being that of Fabricius's inedited "*Systema Glossatorum*") almost exactly correspond with those which still remain unpublished in Dr. Horsfield's valuable work. In adhering to the Fabrician mode of arrangement, the authour has had the advantage of possessing a copy of the first seven sheets (all that had been printed, when the insolvency of the bookseller put a stop to the further progress of the impression) of the "*Systema Glossatorum*," which a lucky chance, as he informs us, put it in his power to obtain. It does not appear whether it would be possible to obtain other copies of this long-lost treasure, of the existence of which we had previously no information; but the manuscript of the remaining portion seems to be regarded as irrecoverable. The seven sheets which Dr. Zincken possesses, contain descriptions of the species of *Urania*, *Amathusia*, *Papilio*, *Zelima*, *Morpho*, *Cethosia*, *Castnia*, *Euplaea*, *Apatura*, *Limenites*, and *Cynthia*, and of the first seven of the genus *Vanessa*. He candidly acknowledges the manifold imper-

fections of the Fabrician arrangement as compared with the present state of entomological science, but refrains from making any alterations, his object being merely, as he states, to describe a certain number of insects as natives of a particular country. To this object his paper is strictly limited: he describes thirty-two species belonging to the genera *Amathusia*, *Papilio*, *Zelima*, *Morpho*, *Cethosia*, *Euplœa*, and *Apatura*, of which nine are regarded as new to science. The far greater number belong to *Papilio* and *Euplœa*, fourteen being referred to the former genus, and nine to the latter. Three plates are filled with good figures of the new species, and of some of those which had been previously described. Among them we find one to two apparently identical with species figured, but not yet described, in Dr. Horsfield's "*Lepidoptera Javanica*."

The second systematic paper in this department of zoology is a "*Monographia generis Midarum*, a C. R. G. Wiedemann," and offers a very full and complete illustration of a genus of dipterous insects not more remarkable for the peculiarities of its structure than for the rapidity with which its numbers have been swelled by recent accessions. In the year 1820, the learned authour described, in Meigen's excellent work on European Diptera, a second species in addition to the solitary individual left by Latreille under the Fabrician denomination. In the following year he added, in the first part of his "*Diptera Exotica*" five other species; and their number was increased to twelve, on the publication of his "*Ausser-Europäische Zweiflügelige Insekten*," in 1828. The present Monograph contains characters, descriptions, and figures of no fewer than twenty-three, and is preceded by a critical dissertation on the origin and orthography of the generic name; on the history of the genus, with a critical examination of the characters assigned to it by successive systematists; and on the habits attributed to its species by Olivier, but neglected by subsequent writers. The figures, which occupy three plates, are well executed, and are accompanied, as regards some of the smaller species, with enlarged representations of the wings, legs, and *antennæ*. For the accuracy of the descriptions the well-known character of the authour is a sufficient guarantee.

The last communication which offers a particular interest to the entomologist, relates to the "*Ixodes ophiophilus*, eine neue Zecken-art, " auf einer Schlange gefunden und beschrieben von Dr. Johannes " Müller." It contains a full description, accompanied by figures, of a new tick, found imbedded in the skin of the nose of a species of *Dipsas*, and closely resembling the figure given by Seba of a similar parasite observed by him insinuated between the scales of an American snake. That other reptiles are equally infested with parasitic ticks, apparently belonging to the same genus, *Ixodes*, is manifest from Hermann's having found similar specimens on the *Testudo Græca*, Sparmann on an African species of Tortoise, Pallas on Crocodiles and Iguanas, and Fabricius on animals of the last named genus. Dr. Müller compares his species with the descriptions given by each of these authours, and points out the differences by which they are distinguished from it, and from each other. His generic character of the group is slightly modified from that given by Latreille. Incidentally he mentions that, of sixty colubrine snakes examined by him among the duplicates of the Bonn Museum, five specimens (belonging to four different species) were furnished with the grooved posterior teeth described by Schlegel, in his paper on that subject, published in the previous volume of the Transactions of the Academy, and noticed at page 378 of our present volume.

Only one other paper connected with recent zoology remains to be noticed; it is from the pen of Dr. Tilesius, and is entitled " Beiträge zur Naturgeschichte der Medusen." The present section is limited to some general observations on the structure and relations of the *Medusæ* in general, to an indication of the principles which influence their natural distribution into families, and to a detailed description of several species of *Cassiopea*; but the learned authour proposes to follow up his subject by a series of papers treating of each of the other groups in succession. He considers them as the representatives of a large class of marine animals, to which he applies the common term, borrowed from Forskähl, of "*Animalia siphonizantia*," their predominating character consisting in the inhalation and expulsion of the water in which they live, by a more or less powerful, more or less regular, and more or less complete

alternation of expansion and contraction. In the more typical among these siphonizing animals the functions of nutrition and respiration are combined, their functions in general being much simplified, and performed by the most simple organs, "These organs," he says, "are tubular muscles, which are very sensitive, irritable and contractile, serving at once for nerves, vessels and intestines. They have hitherto been regarded by anatomists and zoologists as vessels: but the fluid contained within them flows backwards as well as forwards, and they effect in the *Salpæ* and *Medusæ*, a regular succession of contractions and expansions, closely resembling the systole and diastole of the brain, heart and lungs in the higher warm-blooded animals. The greater number of these animals have only one mouth, and all of them but a single stomach. Their digestive process consists merely in the absorption of their prey, and they require in consequence neither liver nor gall-bladder, neither proper intestine nor anus; but their respiration appears to predominate over all their other functions, which are performed solely by means of the respiratory organs. By means of this action they progress in the sea; by its means they secrete their fluids; by its means they suck in their prey; by its means they assimilate the inhaled fluid; by its means they expel their young; and even the embryos thus expelled are in the first instance developed by means of the commencing respiratory action in themselves. By the same means they excrete a luminous gas or nocturnal light, and by a redoubled exertion of this action they change their colour by day." It may here be added, that the authour appears to regard the aggregated *Tunicata*, such as *Pyrosoma*, *Monophora* of Bory de St. Vincent, *Noctiluca* and *Telephorus*, as the young fry of the simple species; but on this and many other points he is somewhat obscure. The observations of M. Chamisso, and more particularly those of MM. Audouin and Milne Edwards, shew that we have still much to learn before a definitive opinion can be formed with regard to the history of the *Tunicata*.

There is little novelty in the authour's principles of classification, as regards the subdivision of the family of *Medusæ*; his sections being almost wholly founded on those of Péron, and consequently too well known to require explanation. The species of *Cassiopea* described and

figured are *Cass. Andromeda*, (*Medusa Andromeda*, Forsk.), *Cass. rhizotomoidea*, (*Cassiopée Borlase*, Pér.), *Cass. frondosa*, Pall., and *Cass. Canariensis*, a new species discovered by the authour at Teneriffe, and especially remarkable for a circle of eight smaller arms placed within the larger, and supported at the extremity of a second and smaller pedicel. This duplication of the arms he compares with a parallel structure in a species of *Loligo*, also found by himself in the Chinese seas, which he figures on the same plate under the name of *Loligo corolliflora*. In illustration of this last he refers to a second species exhibiting a similar structure described and figured by M. Lesueur in the "Journal of the Academy of Natural Sciences of Philadelphia," under the name of *Loligo Pealii*, in which the internal armlets are much smaller, scarcely projecting beyond the fold from whence they take their origin. The descriptions are given with great minuteness; and the figures are well executed, shewing the species in various aspects, and occasionally with some detail.

Of the papers in Fossil Zoology, in which the present volume is unusually rich, the first is entitled "Beschreibung einer neuen Art der Gattung *Pterodactylus*, Cuv., *Ornithocephalus*, Sæm., von Georg Grafen zu Munster." This new species of *Pterodactylus* was discovered by Count Munster in the collection of Dr. Schnitzlein at Monheim, who received it from Meulenhart, near Daiting, in the district of Monheim, where it was found in the same quarry and in the same stratum as the well-known *Crocodylus priscus*, Sæm. On the surface of the block there were visible only the vertebral column, the right *scapula*, some of the ribs, and a portion of the right *femur* and of the *humerus*; the contiguous blocks containing the *cranium* and bones of the foot and hand having been lost by the ignorance of the quarrier. The specimen having been consigned to Count Munster, he immediately set about dissecting the remaining portions of the skeleton, which he found a work of considerable difficulty on account of the hardness and firm consistence of the stone. He succeeded, however, at length in freeing them from their envelope with little injury, and was fully rewarded for his pains by the discovery that his specimen, instead of belonging as he at first

suspected to the *Pterodactylus longirostris*, formed the type of a new species. After describing the peculiar characters of the calcareous schist in which they are found, the authour proceeds to examine in detail the characteristics of each of the remaining bones of the skeleton, as far as he was able to examine them, and institutes a comparison, (the result of which is given in a tabular form,) between their measurements, and those of the bones of *Pter. longirostris*. From the latter the new species, which is the *Pter. medius*, Munst., differs more especially in the following characters: "1, the much greater breadth of the lower jaw in proportion to its length; 2, the sudden narrowing of the lower jaw at its anterior extremity, while in *Pter. longirostris* it becomes broader; 3, the greater length and strength of the teeth, in comparison with the lower jaw; 4, the much shorter neck, and the very different shape of the cervical *vertebræ*; 5, the greater length of the vertebral column, in comparison with the nearly equal length of the lower jaw; 6, the greater breadth and strength of the four or five first ribs in comparison with those which succeed them; 7, the smaller tail; 8, the extraordinary size of the *sternum*; 9, the comparatively greater length of the *tibia* as regards the *femur*; 10, the very different proportion of almost all the joints with regard to the lower jaw; 11, the existence of the *fibula* and the *radius*, of which in the other two species (according to Sæmmering and Cuvier) no vestige is apparent." The authour admits therefore three very distinct species, *Pter. longirostris*, *Pter. brevirostris*, *Pter. medius*; and regards the *Pter. grandis*, Cuv., first made known by Sæmmering in the Transactions of the Munich Academy, and the other bones of a *Pterodactylus* described by Spix in the same collection, as not specifically distinct from the first named, from which they only differ in size, a circumstance probably dependent on the respective ages of the different individuals. All these species are found in the calcareous slate of Solenhofen, Eichstädt, Kelheim, and Monheim, so rich in remarkable organic remains as to have already furnished the authour with no fewer than sixteen fossil species.

Dr. Goldfuss's "Beiträge zur kenntniss verschiedener Reptilien der

“ Vorwelt” are collected under two heads, according to the strata in which the various fossil reptiles of which they treat have been discovered. The first head comprises the reptiles of the lithographic schist, and opens with a review of the history of the genus treated of in the preceding paper, to which it adds another species, the *Pterodactylus crassirostris*, Goldf., noticing at the same time the *Pter. macronyx*, Buckl., from the blue lias of Lyme, which was apparently unknown to Count Munster. The new species is from the lithographic stone of Solenhofen, and is established on a nearly perfect skeleton, wanting little else besides the hinder extremities and the contiguous parts of the *pelvis*. A very careful and detailed description is given of its several bones, which are compared with those of the other species of the genus, and the analogies of the more doubtful among them with the bones of other animals, discussed and ascertained. The description concludes with a tabular view of the dimensions of the several parts in the four German species, the result of which is stated to be that their greatest variation occurs in the relative length of the skull, of the neck, and of the *metacarpus*. The discrepancies between the different species in these and other less important points are then pointed out, and the authour concludes by some general remarks on the peculiarities of the skeleton in this extraordinary genus, and on the indications with regard to its station in nature, its habits, and its mode of existence, which are afforded to us by its remains. Into this investigation our space will not permit us to enter; but we may observe that the authour seems to consider the animals in question as preserving, in all the more essential characters of their skeleton, the true reptile type, but deviating, in the less important organs, towards that of birds on the one hand, and of bats on the other. Their habits he seems inclined to regard as having been very similar to those of the bats of modern days, and hints at the large *Libellula* found in the same lithographic schist, as having formed a part of their means of subsistence. He enters particularly into the question of the kind of covering with which their bodies were clothed, and from various circumstances, which he details at length, comes to the conclusion that his “*Pter. crassirostris* was not covered, like reptiles, with scales and shields,

but with a pelt of soft hairs, almost an inch in length, and perhaps in many parts even with feathers; and that a similar covering is consequently to be presumed in its congeners also." The plates which accompany this part of the memoir represent the new species in its matrix, and restored in its wanting parts by a comparison chiefly with *Pter. longirostris*. An adumbration is also given of the animal hovering over its supposed haunts; and outlines of the *Pter. longirostris* and *Pter. brevirostris* serve as points of comparison and illustration.

In connection with the foregoing new species of *Pterodactylus*, Dr. Goldfuss next proceeds to describe a *cranium* in the collection of Count Munster, from the lithographic stone of Monheim, to which he assigns the name of *Ornithocephalus (Pterodactylus) Munsteri*. The outline of this skull resembles that of a Heron, and still more that of the *Uria Troile*: but the traces of six teeth, perfectly similar to those of *Pter. crassirostris*, Goldf., lying almost in contact with it, lead to the conjecture that it was furnished with teeth. This hypothesis gains additional strength on comparing the outline of the skulls of *Pter. crassirostris* and *Pter. brevirostris*, seen from above, with that of the skull in question; and the authour commends the block in which the specimen is found to the closer examination of its possessor, as a means of confirming or of contradicting his opinion, which is expressed in the name given to the species.

A third new fossil reptile, also from the lithographic stone of Monheim, is the *Lacerta neptunia*, Goldf. The skeleton figured and described is nearly perfect, very few of its parts being lost: it measures in total length three inches and five lines (Parisian measure), and resembles in most particulars the skeleton of the common *Lacerta agilis*; from which it differs chiefly in the smaller number of its dorsal and lumbar *vertebræ*, in its few but larger teeth, in its broader ribs, and in its smaller size.

The other principal head into which this important paper is subdivided comprehends the authour's notes on the fossil reptiles of the schistose *braunkohl* or *papierkohl*, of the neighbourhood of Bonn, so rich in impressions of dicotyledonous leaves as to have been regarded as entirely composed of a mass of such leaves pressed together, and belonging

perhaps to the stems which are abundantly met with in the deeper seated strata of the same *braunkohl* formation. As these leaves chiefly belong to trees inhabiting humid situations, it is not surprising that they should be accompanied by remains of marsh and water animals, and of such insects as live either in the water or on trees. A large collection of such remains has within these few years been formed in the Bonn museum: some have been already made known; and the remainder of the present paper contains descriptions of the reptiles of the extensive series thus collected. The *insects*, we are informed, belong chiefly to the genera *Lucanus*, *Meloë*, *Dytiscus*, *Buprestis*, *Cantharis*, *Cerambyx*, *Parandra*, *Belostoma*, *Cercopis*, *Locusta*, *Anthrax* and *Tabanus*. A small *crab* has been noticed by Dr. Bronn, and there are also three remarkable *Branchiopodous Crustacea*, the largest of which exceeds an inch in diameter. The impressions of *Fishes* appear to belong to two distinct species, the smaller of which has been published by Dr. Bronn under the name of *Cyprinus carbonarius*; the second, which is twice as large, is rarely found as a perfect impression, but more commonly, although still rare, as a mutilated skeleton.

The first of the fossil reptiles from this curious formation is the *Rana diluviana*, Goldf., bones of which are rarely found in good preservation, but their impressions are frequently so perfect as to give a clear indication of the form of the entire skeleton. It is considerably larger than the common green frog of the vicinity, (*Rana esculenta*), and is distinguished from it, at the first glance, by the shortness of its body in proportion to the length of its head; the body of the green frog being almost $2\frac{1}{2}$ times, while that of the fossil species scarcely exceeds $1\frac{1}{2}$ times, as long as the head. Other differences between the skeletons of the two animals are pointed out, and that of the fossil is described in detail with occasional references to the structure of other existing species, with which it is also compared. It is remarkable that the *Rana diluviana* occurs not only in various stages of its growth as a perfect animal, but also in its process of transformation, in the tailed and tadpole state. In this latter state it is also described and figured.

A second *Batrachian reptile* is the *Salamandra Oxygia*, Goldf., found

in the same state as the *frog*, and measuring two inches and seven or eight lines in length. Its skeleton is compared with that of the *common Salamander*, from which it differs in various particulars. "The greater breadth of its head distinguishes it from the *Water Salamanders*; and from all the known species of *Land Salamanders* it differs in the structure of its skull, and in the very backward position of its orbits, by which it approaches the *frogs* on one side and the *Proteus* on the other." Along with this *Salamander* occurs the *Triton Noachicus*, Goldf., a small species referred to that genus on account of its narrow oval skull, and measuring somewhat more than two inches in total length. It differs from the living species of its genus in the structure of its skull, the peculiarities of which are described and figured.

Lastly the author figures an impression representing two fragments of a spirally rolled snake-like body, to which he gives the name of *Ophis dubius*, doubting whether they belong to a snake or a serpentiform fish. It is a curious specimen and well deserves the attention of fossil zoologists.

The "Beiträge zur Petrefactenkunde" of Dr. Von Meyer is also a miscellaneous paper on fossil remains of considerable extent and high importance. It is divided into four sections, the first of which contains "a description of the *Orthoceratites striolatus*, with remarks on the structure and occurrence of certain polythalamous fossil *Cephalopoda*; and a description of *Calymene æqualis*." This part of the memoir commences with a detailed examination of the structure of *Orthoceratites* and of the other fossil *Cephalopods*, and especially the *Belemnites*, to which they are related. In the course of his examination several new facts are brought to light; and additional means of regulating the arrangement of the shells, and of determining the station and characters of the animals by which they were formed, are furnished to the zoologist. The new species described is from the *grauwacke* schist of Herborn; its characters are given with great minuteness, and figured in two plates with much detail. A general essay on the strata in which *Orthoceratites* have hitherto been found, and on the species peculiar to each, together with some notices of other fossil shells occurring in the same localities, forms the subject of the succeeding chapter, and is continued in an

appendix. The *Calymene? æqualis* is from the same locality: it most nearly resembles the *Calymene concinna*, Dalm., and, like it, approaches very closely to the genus *Asaphus*. It is figured in the accompanying plate.

The second section of the memoir is devoted to an essay "On the *Mastodon Arvernensis* of Eppelsheim." Of this species, which was unknown to Cuvier, and first described by MM. Croizet and Jobert, portions, consisting of the left half of the upper jaw and some isolated molar teeth, exist in the Museum of the Grand Duke of Hesse Darmstadt. They were found at Eppelsheim, near Alzei, in the Grand Duchy; and are more worthy of notice as they fill up some deficiencies in the account of the skeleton which the first describers were compelled, from the incompleteness of their materials, to leave open to subsequent investigation. The whole of the materials are described at length, and the differences existing between them and the corresponding parts of *Mast. maximus* and *angustidens* are carefully noted. It appears that, in addition to the Auvergnian and Hessian habitats, the species is found in the Jura formation at Salmandingen and on the Heuberg; and also at Friedrichsgemünd in Bavaria. In the last named locality it occurs in a heliociferous limestone in company with remains of *Mastodon angustidens*, *Palæotherium Aurelianense*, *Rhinoceros incisivus*, *Charopotamus Sæmmeringii*, a *Lophiodon*, a small carnivorous animal, a *Cervus*, Tortoises, and other terrestrial quadrupeds; with regard to which, and to the tertiary formation in which they are found, Dr. Meyer states that he is preparing a separate memoir. The plate represents the Eppelsheim fragment of the upper jaw.

"The genus *Aptychus*," Mey., (which is synonymous with *Trigonalites*, Park., *Tellinites*, Schloth., *Ichthyosiagones*, Bourd., and *Lepadites*, Germ.) is the subject of the following section. These paradoxical fossils, although known and figured so early as the time of Scheuchzer, and examined and described by many subsequent oryctologists, have hitherto, according to our authour, been completely misapprehended, as regards their affinities and classification. To the hypothesis that they are the remains of bivalve shells, which at first sight they closely resemble, he

objects that when the two halves, into which they are subdivided, are brought into contact they meet only at three points of their margin; that there is no trace of muscular impressions on their surface; and that their hinge, or point of connection between the valves, is of a totally different character from that of any known bivalve. On treating the fossil with diluted muriatic acid, its calcareous portion was dissolved, and the skeleton which remained was found to be porous and cellular, and forcibly called to mind the structure of the internal shell of *Sepia*. "Its structure," the authour observes, "is altogether peculiar, and may perhaps be explained by saying that as in *Sepia lamellæ* of horn, so in this case *cells* of horn, are filled with a calcareous substance." This curious mode of formation is described with much detail in the paper, to which we must refer for many valuable observations on this and other points. But the discovery of evident traces of the soft parts of the animal leads to considerations of still higher importance, "The structure of the shell" according to our authour, "speaks not only of a molluscous animal in general, but also indicates with certainty a naked *mollusk*, the shell being internal. We can only further enquire whether this naked *mollusk* belongs to the *Gasteropoda* or the *Acephala*? For answering this question we possess again no other materials than the shell. As we have seen, it is formed, in its characteristic parts, like an imperfect bivalve, and I believe therefore that the animal cannot be referred to the true *Acephala*. As regards the determination of the anterior and posterior sides, and the position of the head, I must refer to an unfinished work of mine, treating of the metamorphosis of the shells of *Mollusca*, in which I shall also develop my views with respect to the normal position of the shell. We have thus the type of a molluscous animal, such as none has yet been found. May not this be regarded as improbable or somewhat far-fetched. But this view has offered itself to me after a careful treatment and examination of its parts. It does not contradict the time when the animal existed as a living form. Were *Nautilus* and *Spirula* not extant in our living creation, what should we say of *Ammonites* and *Belemnites*? *Aptychus* lived along with these. How shall we comprehend *Ornithocephalus* or *Pterodactylus* within the

limits of our system of living animals? and where shall we arrange the *Lizards* and the *Crocodiles* which in truth are neither *Lizards* nor *Crocodiles*? With such animals *Aptychus* also lived. It is evident from this how rich is the calcareous schist of Solenhofen in types new, but by no means improbable, which may happily enlarge the boundaries of our system." Dr. Meyer rejects as altogether untenable Germar's hypothesis that these shells belonged to a fossil *Lepas*, and that of Bourdes that they were the jaws of a fish; and combats at considerable length the opinion of Dr. Rüppel, who regards them as the *opercula* of a shell in outer form resembling an Ammonite. To the animal of this shell, in the aperture of which crushed specimens are not unfrequently found, Dr. Meyer rather suspects them to have served as food. The character of the strata in which they are found is treated of at some length; and an appendix adds two new forms to those previously described in the paper itself. Three plates are occupied with the figures and details of these several forms.

The fourth and last section comprehends the descriptions of several "New Fossil Reptiles of the Saurian Order;" an order in which the authour states that he has met with so much that is peculiar that he believes himself to be in a condition to give a new systematic arrangement, which will be the subject of his next paper. The present is limited to notices of certain new species of the Order, forming the types of three new genera. The first of these he describes under the name of *Racheosaurus gracilis*: it is founded on a considerable portion of the *vertebræ*, ribs, *pelvis*, and hinder extremity of a skeleton, in the collection of Dr. Schnitzlein at Monheim, imbedded in a block of calcareous schist brought from Daiting near Solenhofen, the well-known locality o. Sæmmering's *Crocodilus priscus* and of so many other remarkable organic remains. The second, *Pleurosaurus Goldfussii*, Mey., is founded on nearly similar portions of a skeleton, also from the calcareous schist of Daiting, in the collection of Count Munster; it is described at much less length than the preceding specimen, and is not (as is the case with the *Racheosaurus*) figured either wholly or in detail. The third genus is established on a specimen in the Royal Museum at Dresden,

first described by Eilenburg in 1755, and confounded in more recent times with the *Æolodon* (*Crocodylus priscus*, Sæm.) to which it was referred by Cuvier in the last edition of his "Ossements Fossiles." It has since been characterized and partially figured by Dr. Jäger, under the name of *Crocodylus Bollensis*; the specimen having been found in the lias at Boll in the kingdom of Würtemberg. The authour points out the differences in its several extant parts which distinguish the skeleton of this animal from that of *Æolodon*, and gives it, on account of the extraordinary length of the bodies of its *vertebræ*, the generic name of *Macrospondylus*. He concludes his paper by the description of some portions of a skeleton of the *Pterodactylus macronyx* of Dr. Buckland, found in the lias at Banz in company with an almost perfect skeleton of a large Saurian with a long muzzle, and with the bones of a tortoise. The remains of the *Pterodactylus* are figured in the accompanying plate.

The last paper which falls under our cognizance is entitled "*Testudo antiqua*, eine in Süßwasser-Gypse von Hohenhöwen untergegangene Art; beschrieben von Dr. Heinr. G. Bronn." It contains a full description of a new species of fossil *Tortoise* from the fresh-water Gypsum of Hohenhöwen, made from numerous specimens that came under the authour's observation in various collections. The remains are compared with *Testudo Græca* and *Test. tabulata*, and with the fossil species hitherto observed; and are finally characterized as follows: *Test. antiqua*, "*testâ lato-ovatâ, antice gibbâ et medio margine incisa; squamarum vertebralium areis convexiusculis, muticis, obsoletè radiatim striatis, medio punctatis; squamis marginalibus 24 (22?), imparibus antica et postica e duabus connatis ortis; sterno anticè subconvexo-truncato.*"

ART. LXV. *Notice of some recent Publications on the Chinchillidæ.* By E. T. BENNETT, Esq., F.L.S., Sec. Z.S.

In June 1832, I brought under the notice of the Zoological Society an animal then living at the Gardens in the Regent's Park, and forming the type of a new genus, nearly related to *Chinchilla*, which I proposed to call *Lagotis Cuvieri*. The death of the specimen, in the spring of 1833, enabled me to complete its characters, which were laid before the Society at its first Meeting in May of that year (together with a revision of the interesting little family of *Rodentia* of which it forms a part), and published immediately afterwards in the Society's "Proceedings," and in the course of August in its "Transactions." In this paper I regarded the family of *Chinchillidæ* as consisting of three genera, *Lagotis*, *Chinchilla*, and *Lagostomus*, each composed of a single known species; with the addition of the *Callomys aureus* of M. Isidore Geoffroy St. Hilaire, an animal of somewhat doubtful position, characterized only from the inspection of imperfect and mutilated skins.

In the month of March, 1833, Dr. F. J. F. Meyen, a naturalist previously distinguished for his researches in vegetable anatomy, transmitted to the Imperial Academy Naturæ Curiosorum, the second part of a series of zoological observations made during a voyage round the world, containing a revision of the same family, for which he adopts from Wiegmann the name of *Lagostomi*, and to which he refers six genera, viz. *Pedetes*, *Lagostomus*, *Eriomys*, *Chinchilla*, *Galex*, and *Lagidium*: of *Lagostomus* he enumerates three distinct species. From these views, (which were published towards the end of 1833 in the "Nova Acta Academiæ Cæsareæ Naturæ Curiosorum," tom. 16, pars post., p. 574), my own appear to differ so widely that it may be requisite to offer some explanation of the little coincidence that is to be found between our several papers. For this purpose I shall follow the order observed in Dr. Meyen's Memoir, remarking on the discrepancies as I proceed.

As regards the South African genus, *Pedetes*, Ill. (or *Helamys* of M. F. Cuvier) I can by no means concur with the German zoologists who have proposed to associate it with the South American family of *Chinchillidæ*, although, as I have already stated in my paper in the Zoological Society's "Transactions" p. 62, "it seems in many of its characters to approach *Lagostomus*." I am still uncertain as to its true position, which I continue to think we are not yet furnished with sufficient materials to determine; but I am convinced that its relation to the *Chinchillidæ* is not one of near affinity. "The differences in the relative proportion of the limbs, in the elongated claws of its anterior extremities, in the character of its fur, and above all in the structure of its teeth, forbid," as I have there stated, "a close approximation."

The genus *Lagidium* of Dr. Meyen is synonymous with my *Lagotis*; and the species named by him *Lagidium Peruanum* appears to be identical with *Lagotis Cuvieri*. The ascertainment of its *habitat* on the elevated *plateaux* of Peru, confirms the accuracy of my decision, unassisted by any evidence as to locality, regarding its identity with the *Viscacha* of Peruvian travellers. Of its habits, as witnessed by himself in its native country, Dr. Meyen gives some interesting particulars. He states that it is most abundant just below the limits of perpetual snow, and does not form those extensive subterranean excavations so well known as the work of the *Viscacha* of Buenos Ayres; it was moreover invariably found among the rocks, and never on the level ground. On several occasions it was shot during the day, but was seen most frequently at sunset, being excessively abundant, although pursued with avidity on account of the good flavour of its flesh, which, however, is not so tender as that of the hare. The fabrication of stuffs from its wool, so general in the time of the Incas, has now entirely ceased; and such stuffs are only to be met with among the rarities found in the tombs of the ancient inhabitants. Dr. Meyen further adds that the skins of these *Viscachas* are brought to us through Buenos Ayres as an article of commerce, but are not so highly prized as those of the *Chinchilla*. He gives a figure of the animal, and good representations of its skull and teeth.

Of *Lagostomus*, as I have before observed, Dr. Meyen enumerates three species. The two first of these represent the animals respectively figured by the late Mr. Brookes and by M. Lesson under the name of *Lagostomus trichodactylus*, which he considers as distinct on account of the differences observable between the two figures. These consist in the small and curved claws of the hinder foot in the former, contrasted with the large size and nearly straight direction of the same organs in the latter; in the habit; and in the shape of the tail. The misapprehension is undoubtedly very excusable; but it may serve to shew how dangerous it is to rely on figures only in the discrimination of species. As regards the first presumed distinction, I have already observed (p. 57 of my paper) that "in this particular the figures given by Mr. Brookes are defective, as exhibiting the claws far smaller and more curved than is natural." A reference to the descriptions of M. F. Cuvier and M. de Blainville, both taken from Mr. Brookes's specimen while living, will confirm the accuracy of this observation; the latter in particular (*Desm. Mammal.* No. 508) describing the middle toe of the hinder foot as furnished with a very strong claw. On the second point, the habit, it need only be observed that both figures were taken from stuffed skins by artists who had never seen the living animal; and who could consequently give only their own conjectural ideas of its natural appearance when in a living state. On the third, it may be observed that some obscurity is to be feared, M. de Blainville having described the animal while living as having its tail truncate and mutilated, and Mr. Brookes's skin and skeleton being both provided with perfect tails. I may add that a fine skin now in the possession of the Zoological Society agrees in all essential particulars with the animal figured by M. Lesson, and as far as my recollection goes, with that which formerly formed part of Mr. Brookes's Museum. The figure given by the latter should only be considered correct in so far as it is borne out by the descriptions of MM. F. Cuvier and de Blainville, which should be referred to in connexion with it.

The third species of *Lagostomus* enumerated by Dr. Meyen is the *Eriomys Chinchilla* of Dr. Lichtenstein, figured and described in that

learned zoologist's "Darstellung neuer oder wenig bekannter Säugthiere;" a work unknown to me at the period when my paper was published. The figure there given so closely resembles the true *Chinchilla lanigera* in all its prominent features, that I should not have hesitated to refer it to that animal, had it not been accompanied by separate representations of the feet, which offer only four toes on the anterior and three on the posterior extremities; and had not the almost proverbial accuracy of the distinguished authour rendered it difficult to doubt the correctness of his observations in the text, referring with scrupulous particularity to this very point. As a synonym, however, Dr. Meyen quotes the *Callomys laniger* of M.M. Isid. Geoffroy St. Hilaire and D'Orbigny fils; and in this case there can be little doubt that those excellent zoologists overlooked the small and almost rudimental inner toe both of the fore and hind feet; the identity of this animal with the *Chinchilla lanigera* of Dr. Rousseau being unquestioned by the Parisian zoologists, who have ample opportunities of comparing them, and M. Geoffroy himself having subsequently admitted the generic distinction of the *Chinchilla* (his *Callomys laniger*) from his genus *Callomys* (the true *Lagostomus*.)

The *Chinchilla* of Mr. Gray, which forms the fourth genus enumerated by Dr. Meyen as belonging to this family, is beyond all question the only *Chinchilla* yet noticed by English zoologists, and consequently identical with that figured in Mr. Griffith's edition of Cuvier's "Animal Kingdom," as well as with the *Chinchilla* of my paper; and I see no reason for doubting that the *Eriomys* of M. Vander Hoeven, the fifth genus enumerated in Dr. Meyen's list, is founded on the same species: there is nothing in the character that is not strictly applicable to it.

His sixth genus, *Galex*, is established on a skull found at the entrance of a burrow belonging in all probability to a yet undescribed species of the family of *Chinchillidæ*; as the characters of the animal inhabiting the burrow, which was seen only at a distance, appear closely to resemble those of a true *Chinchilla*. The skull and teeth, however, according to the figures given by our authour, belong to a very different family, that of the *Caviidæ*; with none of the known genera of which

do they altogether agree, although they approach most nearly to *Kerodon*.

I may add that the *Dendrobius Degus* of Dr. Meyen, described and figured in the same Paper, is my *Octodon Cumingii*, the characters of which were laid before the Committee of Science and Correspondence of the Zoological Society in March 1832, and shortly afterwards published in its "Proceedings," part 2, p. 46, & seqq. Molina's description of his *Sciurus Degus* differed so greatly from the animals from which mine was taken, and which are still (September, 1834) living in the Society's Gardens, that I hesitated to quote that name as a synonym; and I am not quite sure whether Dr. Meyen states of his own knowledge, or on Molina's authority, that his animal is called *Degus* by the natives of Chili. If the former, the synonym can be of course no longer doubtful.

ART. LXVI. *Scientific Notices.*

Note relative to Bulinus hæmastomus, p. 101 of this 5th vol.

The occurrence of an egg of *Bulinus ovalis*, brought from *Rio de Janeiro* by my friend Thomas Miller, Esq. R. N., which I showed to Mr. Broderip as a novelty, led him to suggest to me that the eggs mentioned at p. 101 of this volume were laid by that species, which, however, is there called *Bulinus hæmastomus*. There can be no doubt of the specific identity of the two individuals, and I know not how to account for the mistake in nomenclature thus detected. Certain it is that the *Bul. hæmastomus* has never been brought to Europe from Rio, nor has *Bul. ovalis* ever reached England from any other Country. The representa-

tions given in TAB. SUPPL. XVI, bis, f. 3, 4, were not taken from the eggs laid in the stove at the Garden of the Horticultural Society, but from those of *Bul. Hæmastoma** from St. Vincents. The Museum of the Zoological Society, where the eggs mentioned at p. 101., and the shell of the parent were deposited, has been searched, but the specimens are unfortunately mislaid.

G. B. SOWERBY.

Notice on Mus messorius, Shaw, *Less long-tailed Field Mouse of Pennant*. By W. J. BRODERIP, Esq., F.R.S., &c.

Neither Mr. White nor the other authours who notice this small species appear to have observed that their tails are slightly prehensile. I had a pair in a dormouse's cage, and have frequently seen them coil the end of their tails round the bars, especially when they were clambering along the sides or on the top of it. They became very familiar, soon recognized their friends, and would lie down or rear themselves up, to be tickled with a straw or a pen; an operation which they evidently enjoyed much.

Note on the "russet-pated Chough" of Shakspeare.

In reply to Dr. Heineken's enquiry (page 200) as to the bird meant by this appellation, it may be suggested that the correct reading is probably *russet-patted*, a hybrid, and consequently a barbarous phrase, but one which may be regarded as a not unapt version of *red-legged*.

E. T. B.

* This is the correct termination.





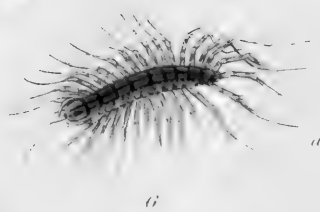
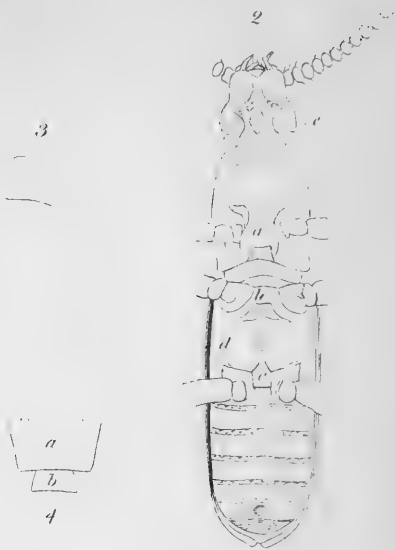


Fig. 2.

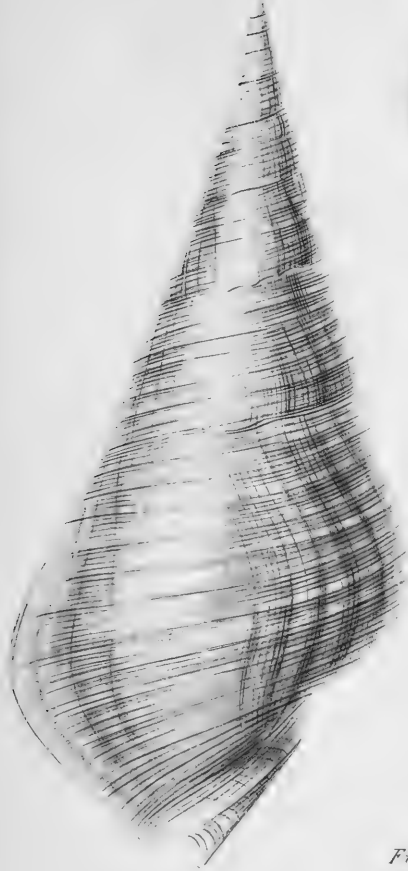


Fig. 1.



Fig. 3.



Fig. 6.



Fig. 4.

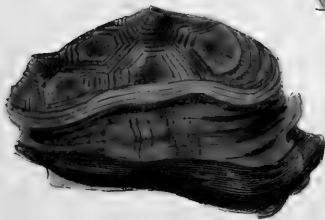
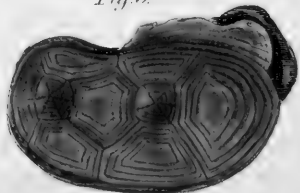
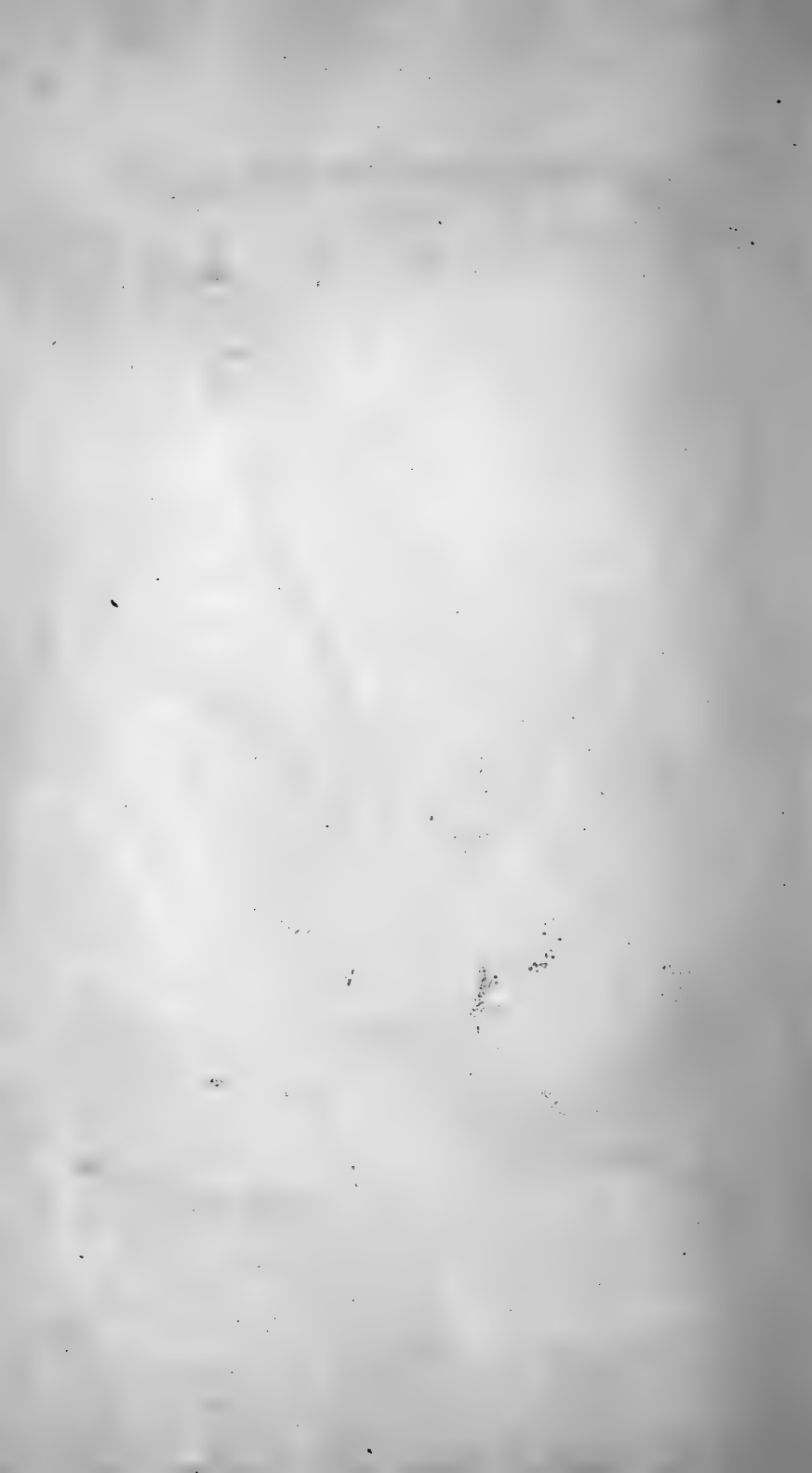


Fig. 5.







1a



1



2



3



3a



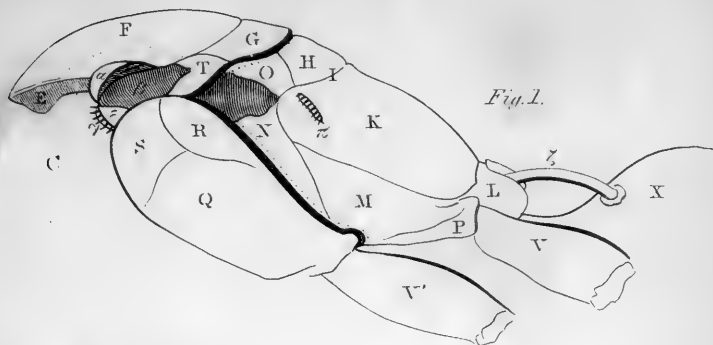


Fig. I.

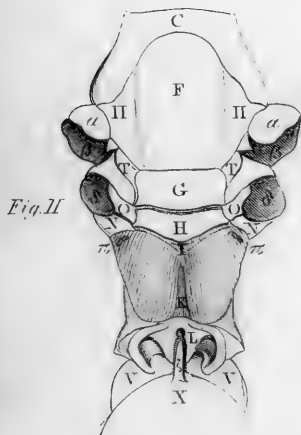


Fig. II

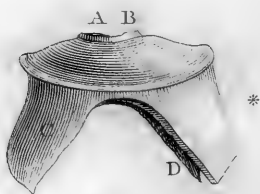


Fig. III

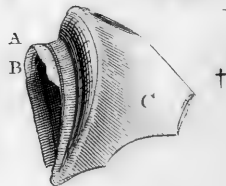
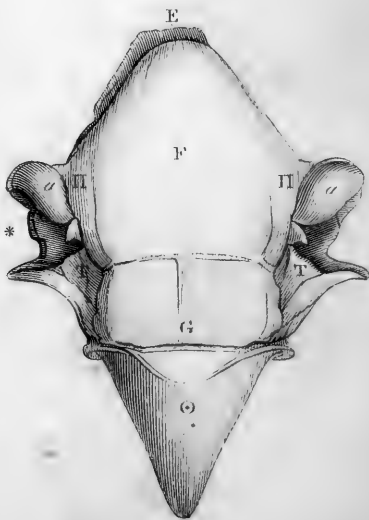
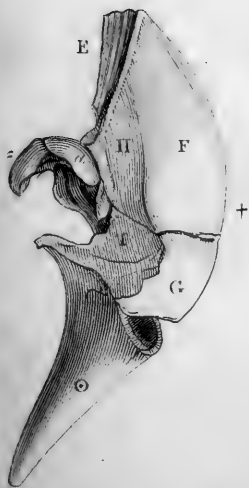


Fig. IV





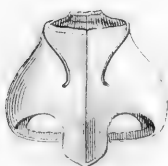
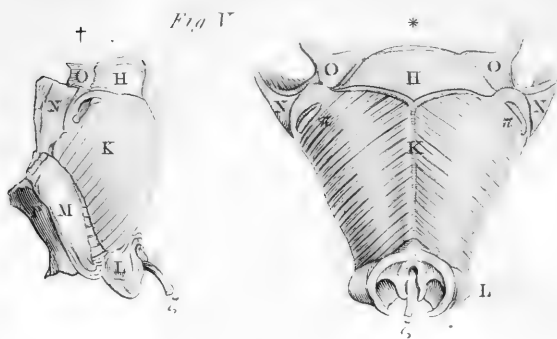


Fig. VIII.

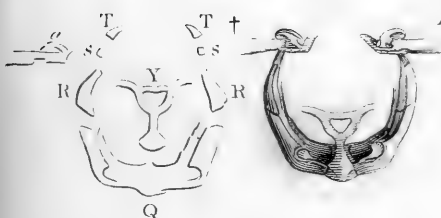
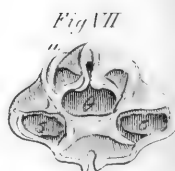
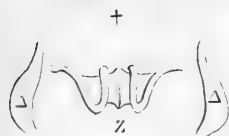
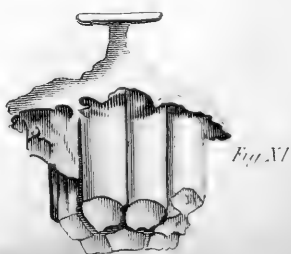


Fig. IX.

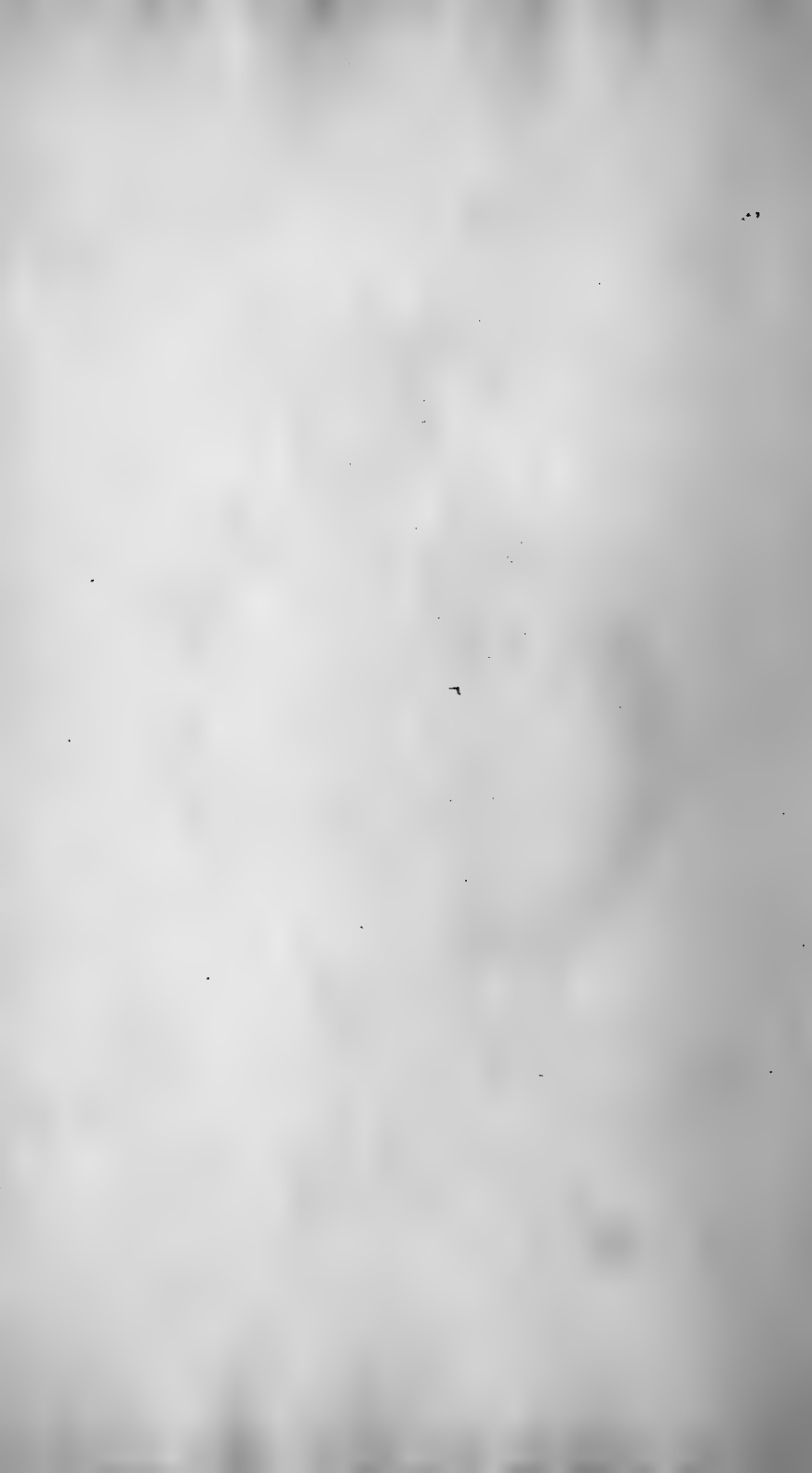
















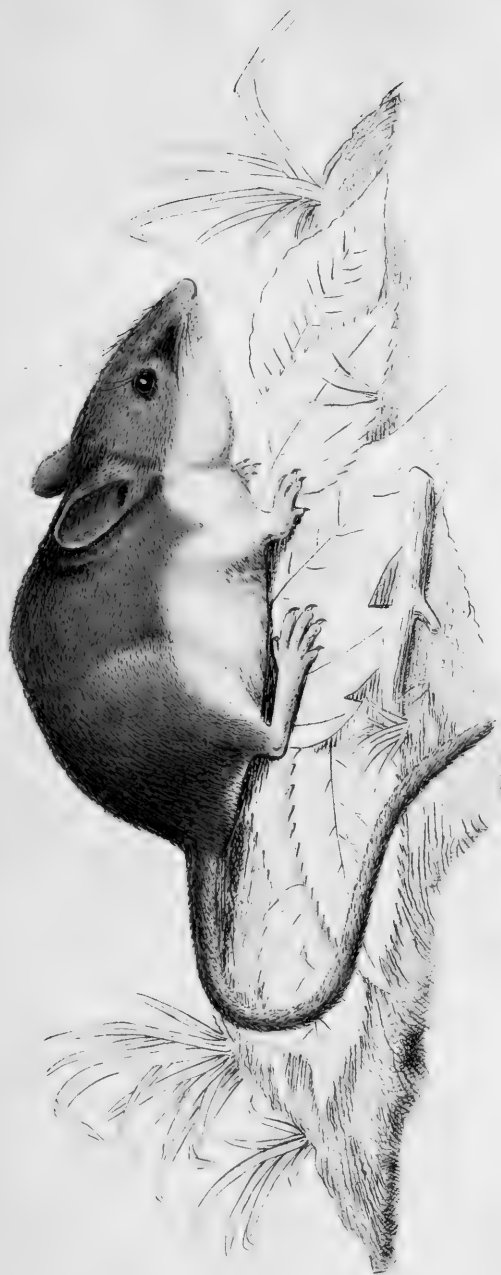




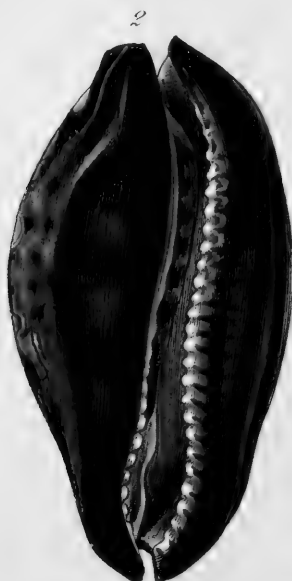
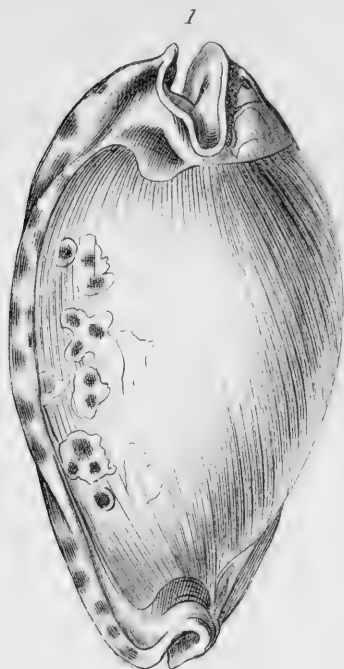


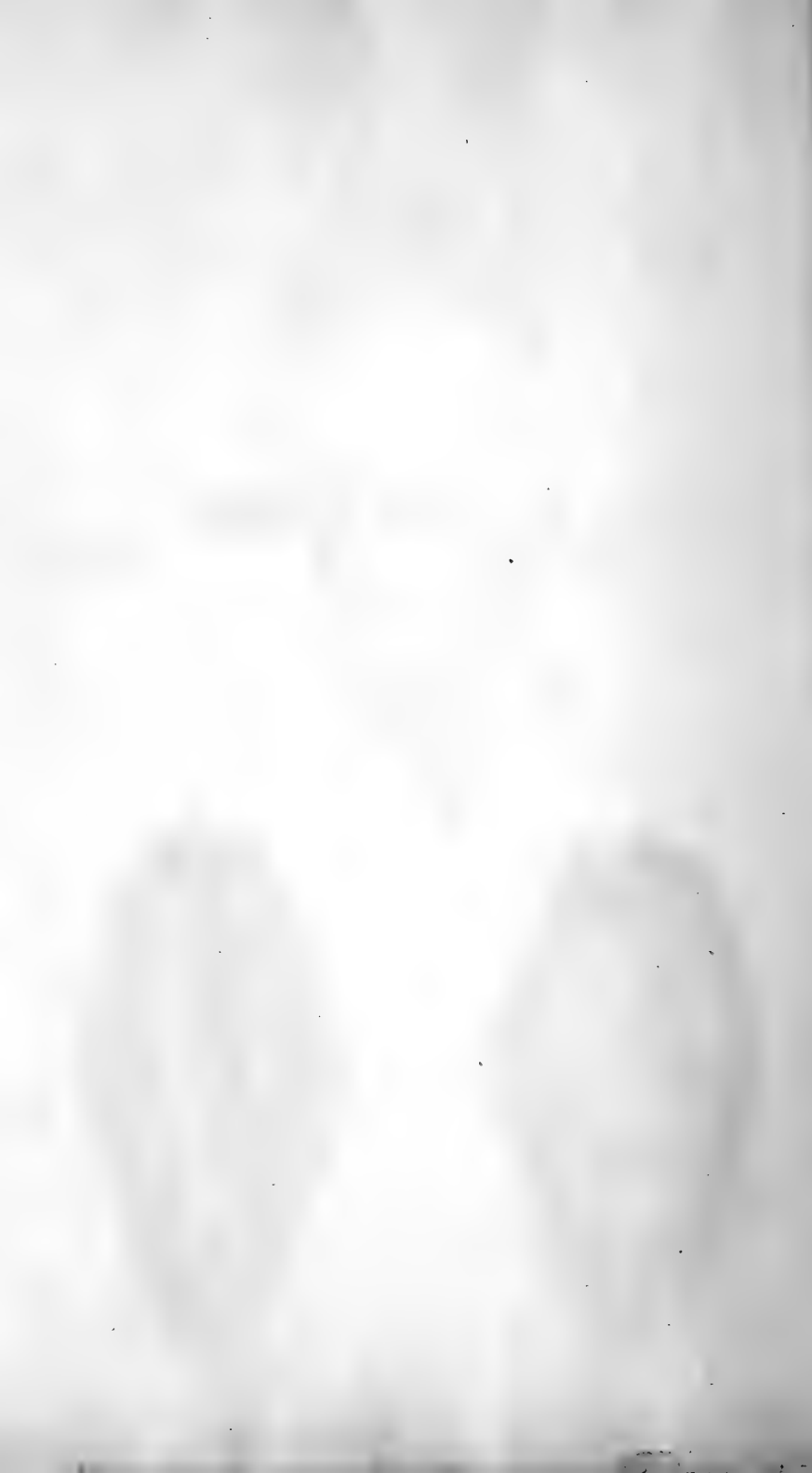


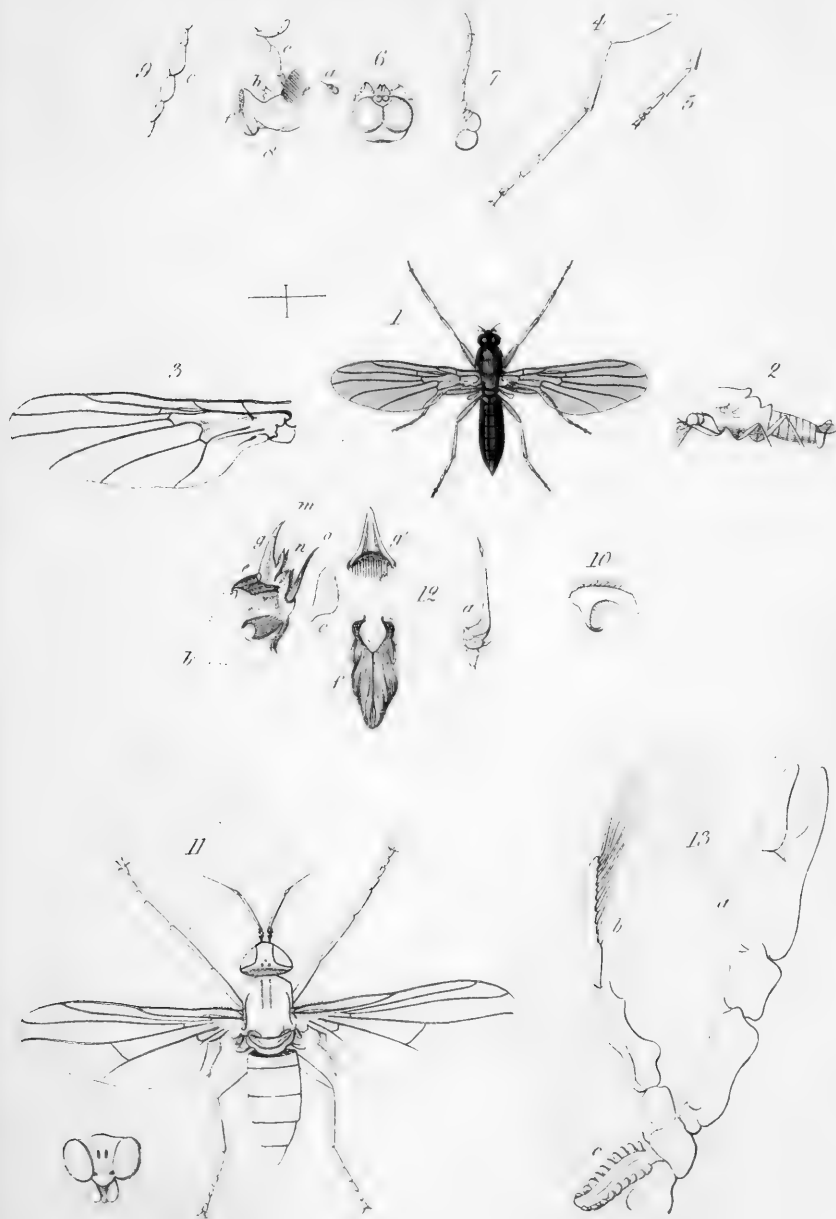




Fig. 1. 2. *Cypraea Scottii*.
" 3. Back of young shell.







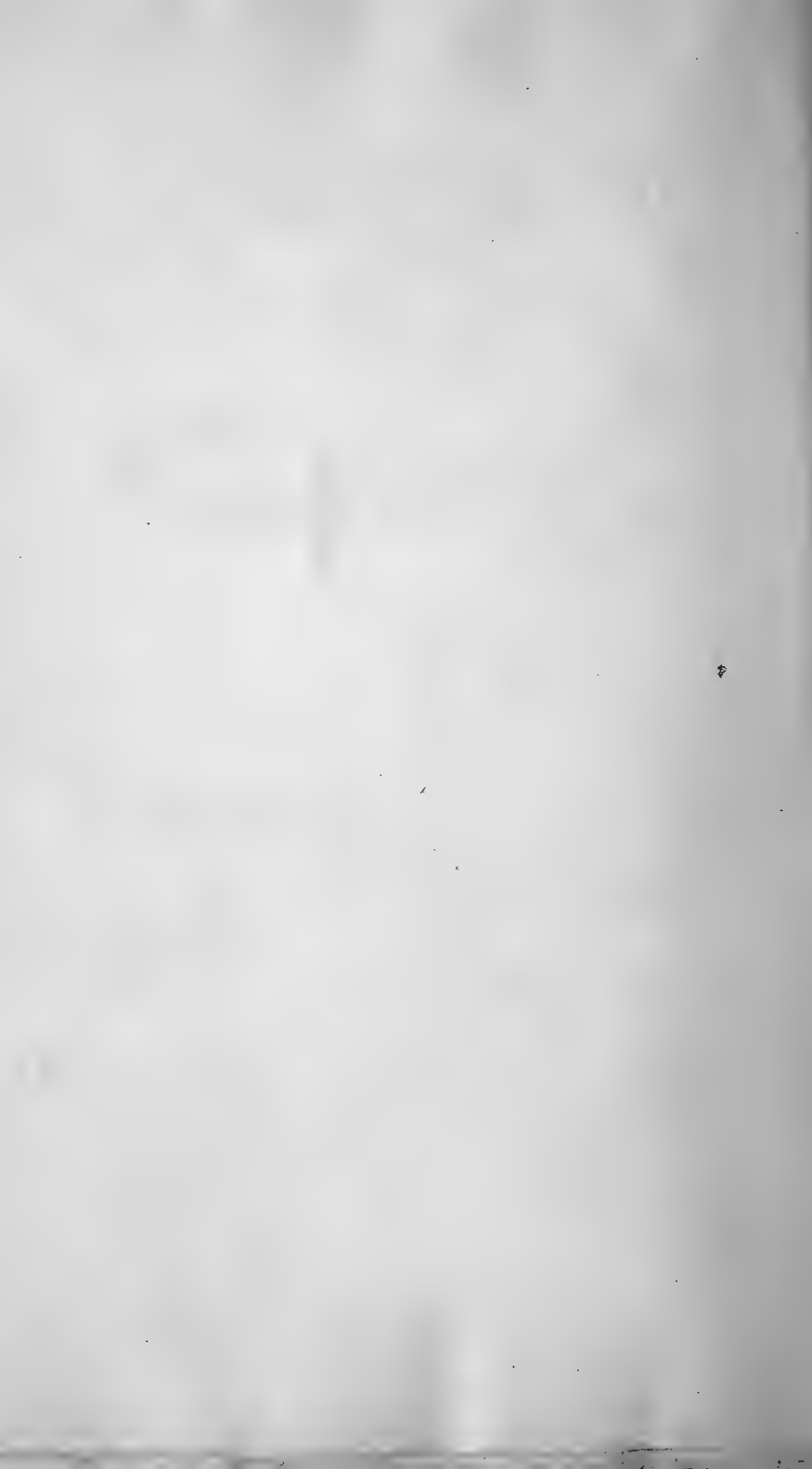
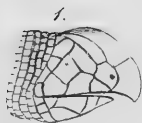




Fig. 1.



Fig. 2.

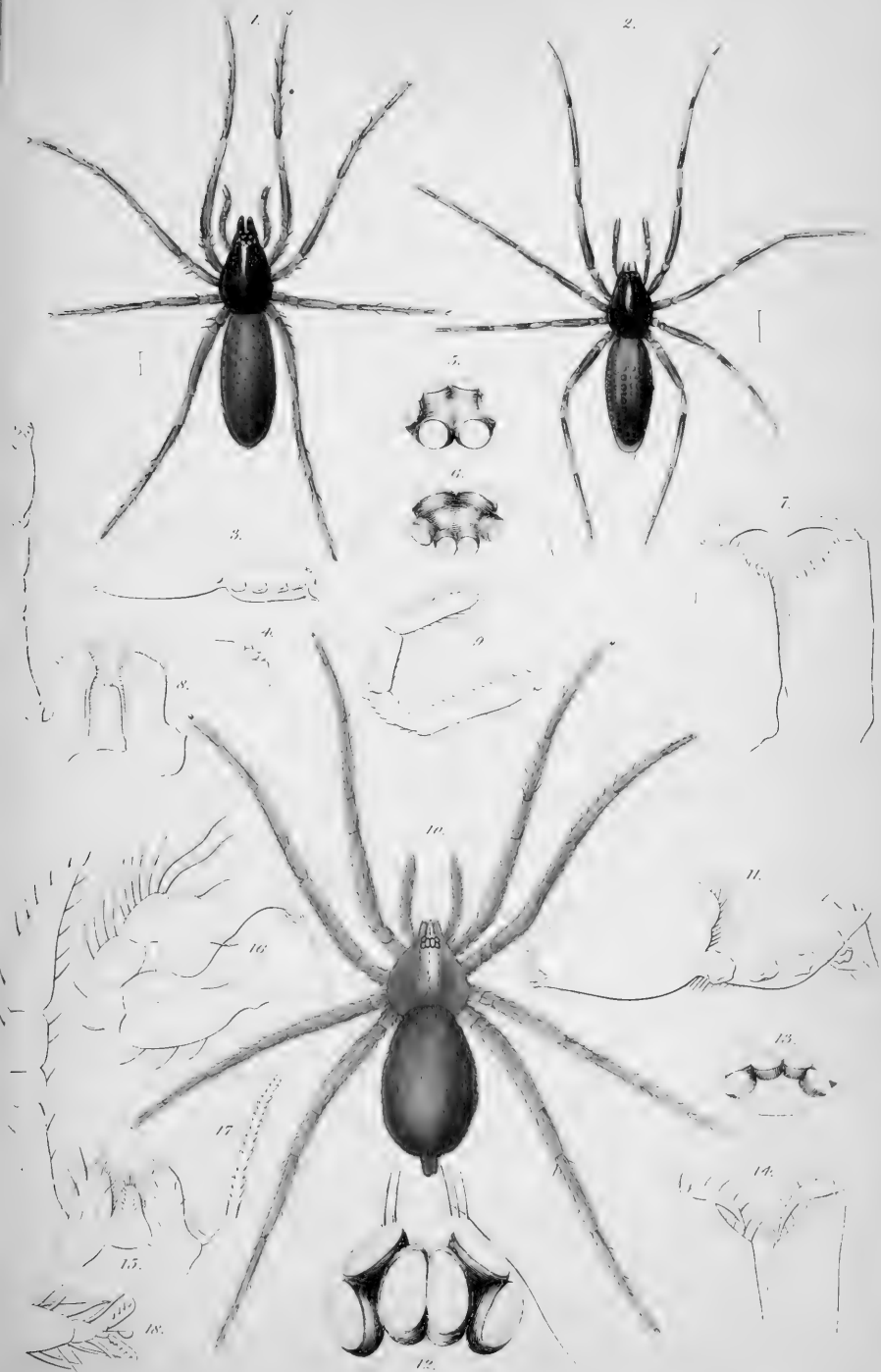


3.



4.







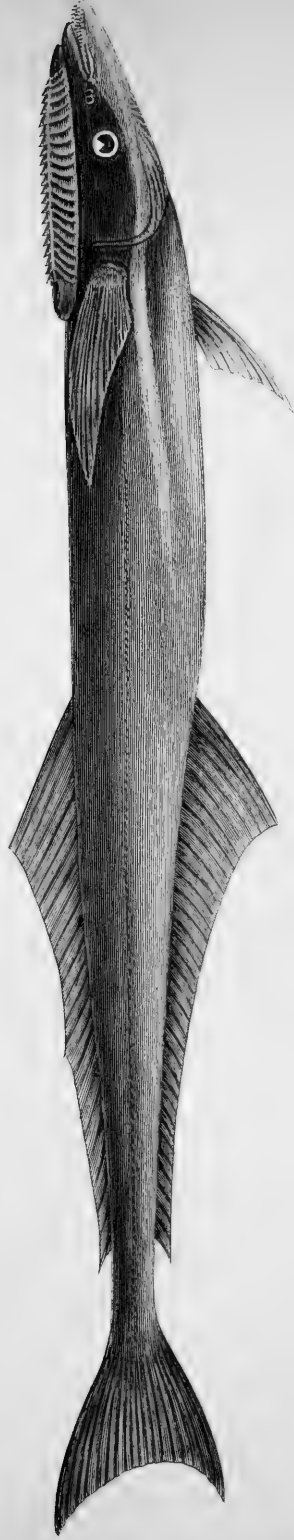


Fig. 1.

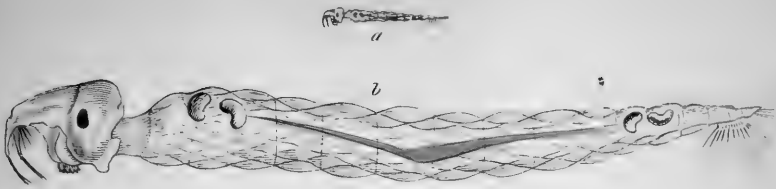


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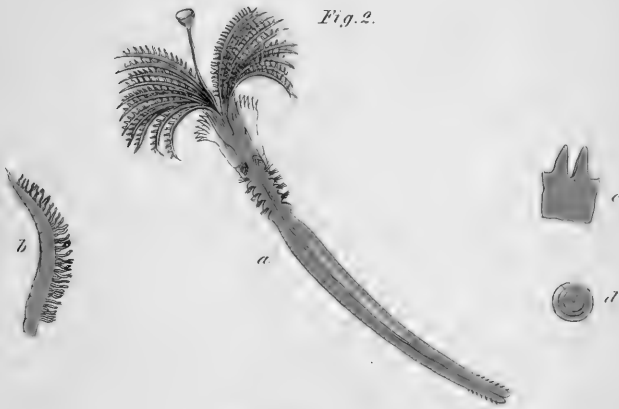


Fig. 3.



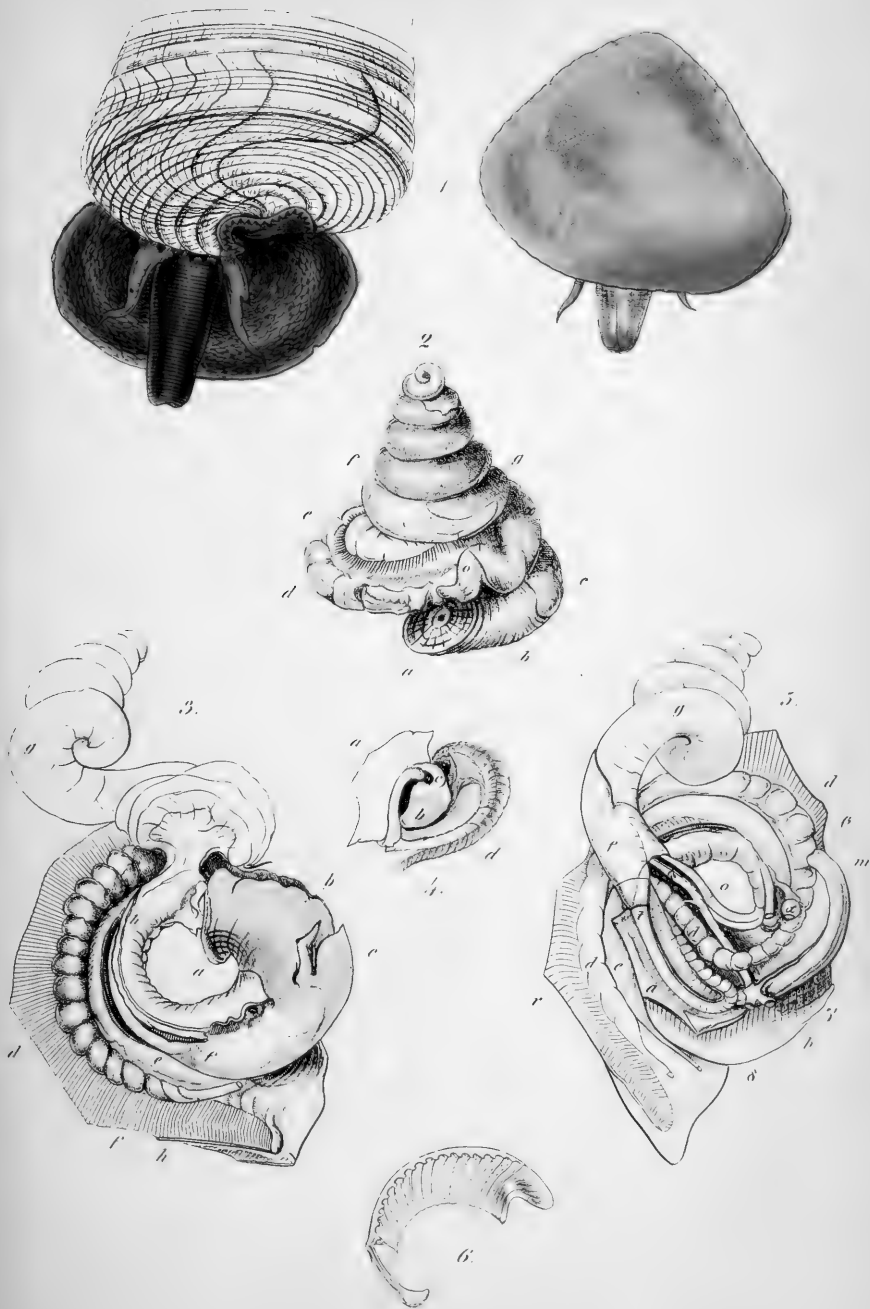
Fig. 4.

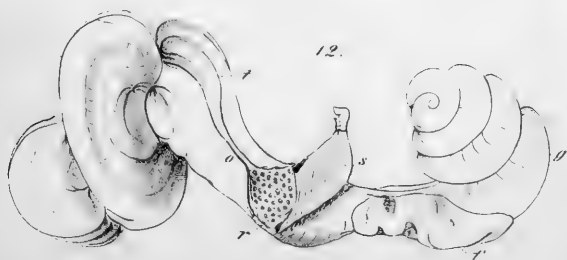
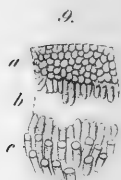
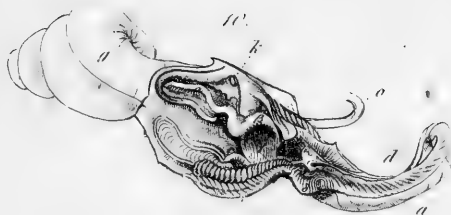
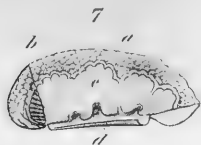


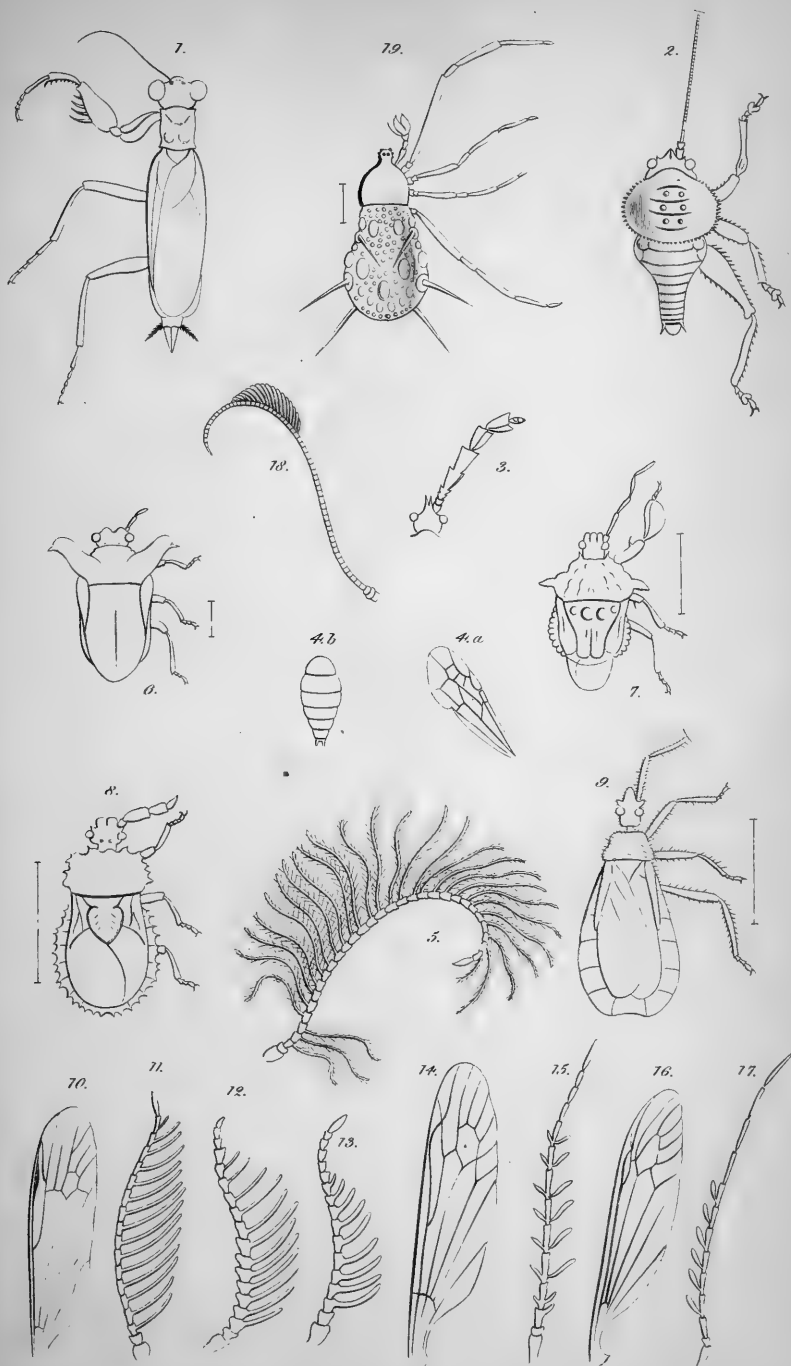
Fig. 5.













Platycercus pacificus. $\frac{1}{2}$ long. nat.



Platycercus auriceps.





Platycercus ulietanus.
 $\frac{1}{2}$ long. nat.





Psittacus pyrrhopterus.





Thamnophilus Swainsonii.



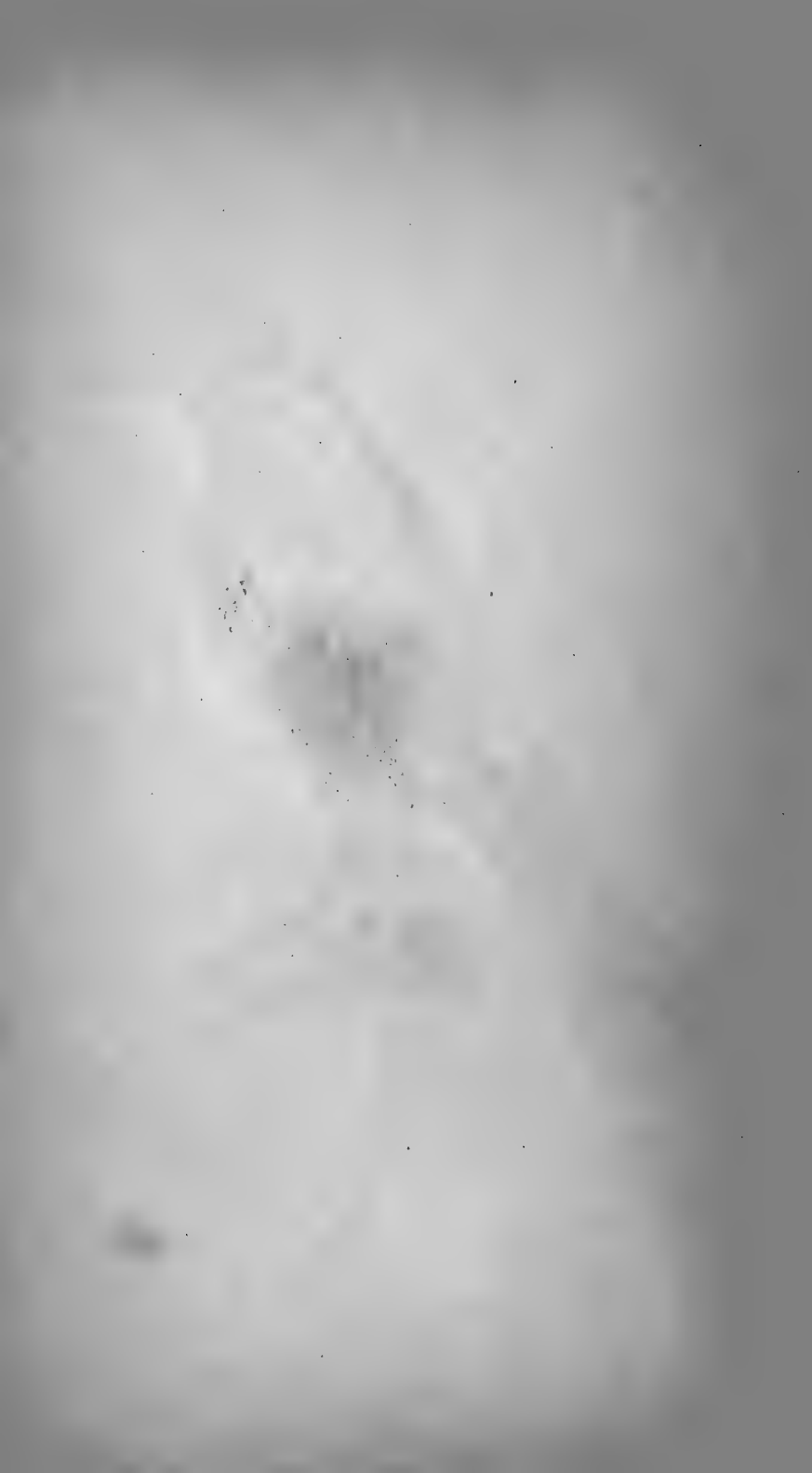
Thamnophilus maculatus.



Thamnophilus Vigerii. mas.
 $\frac{1}{2}$ long. nat.



Thamnophilus Vigorsii, f. ten
 $\frac{1}{2}$ long. nat.

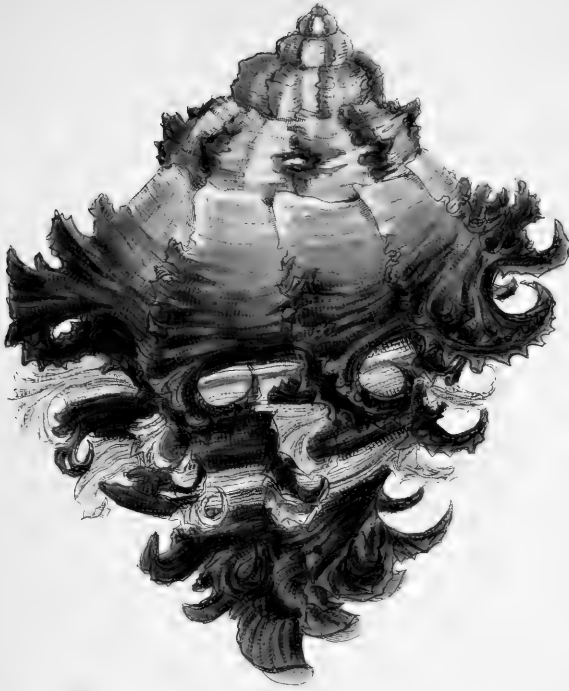




Xanthornus chrysopterus.
♂ long. nat.



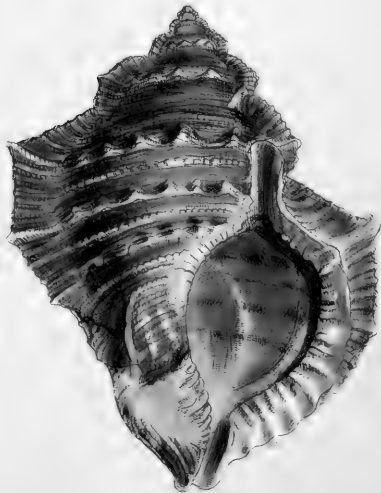
Leistes Suchii.
²/₃ long. nat.



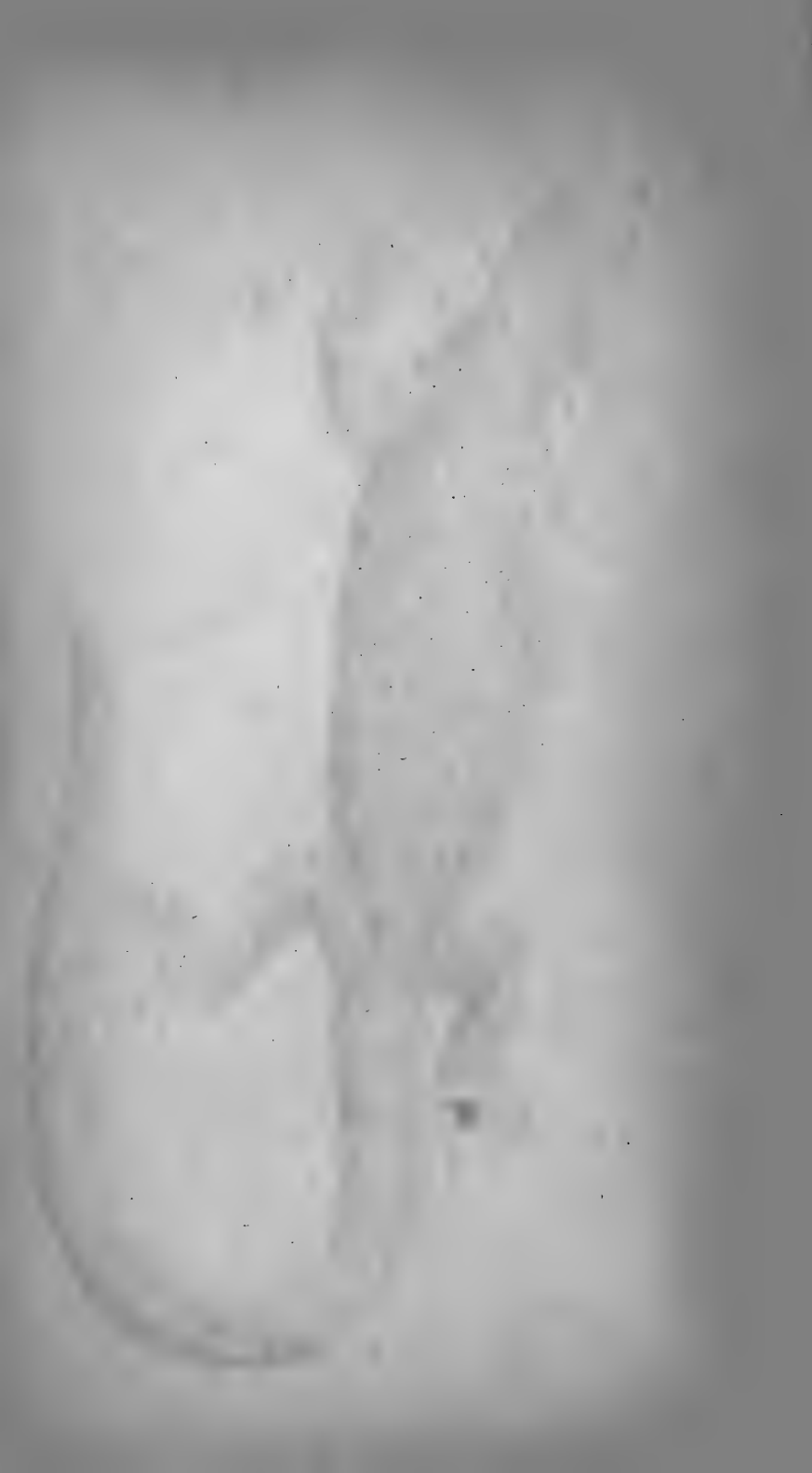
3

2

1

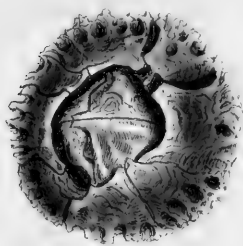


1. *Randallia foliata*.
2. *crumena*.
3. *Murex saxicola*.

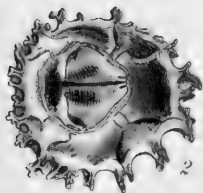
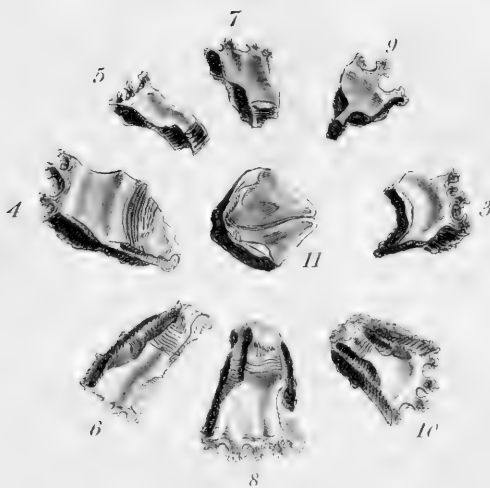




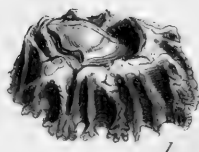
Amblyrhynchus cristatus.
J. Long, nat.



1

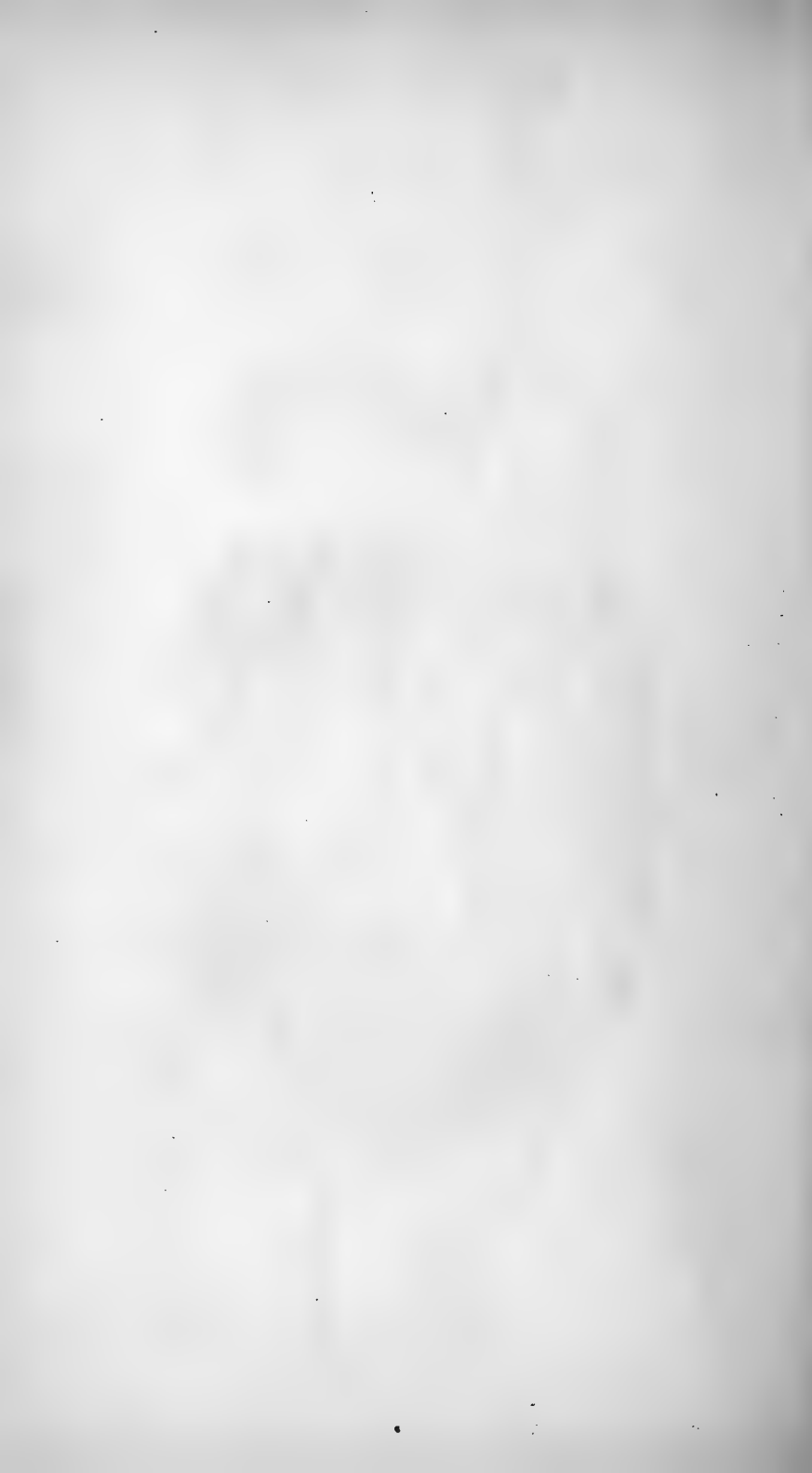


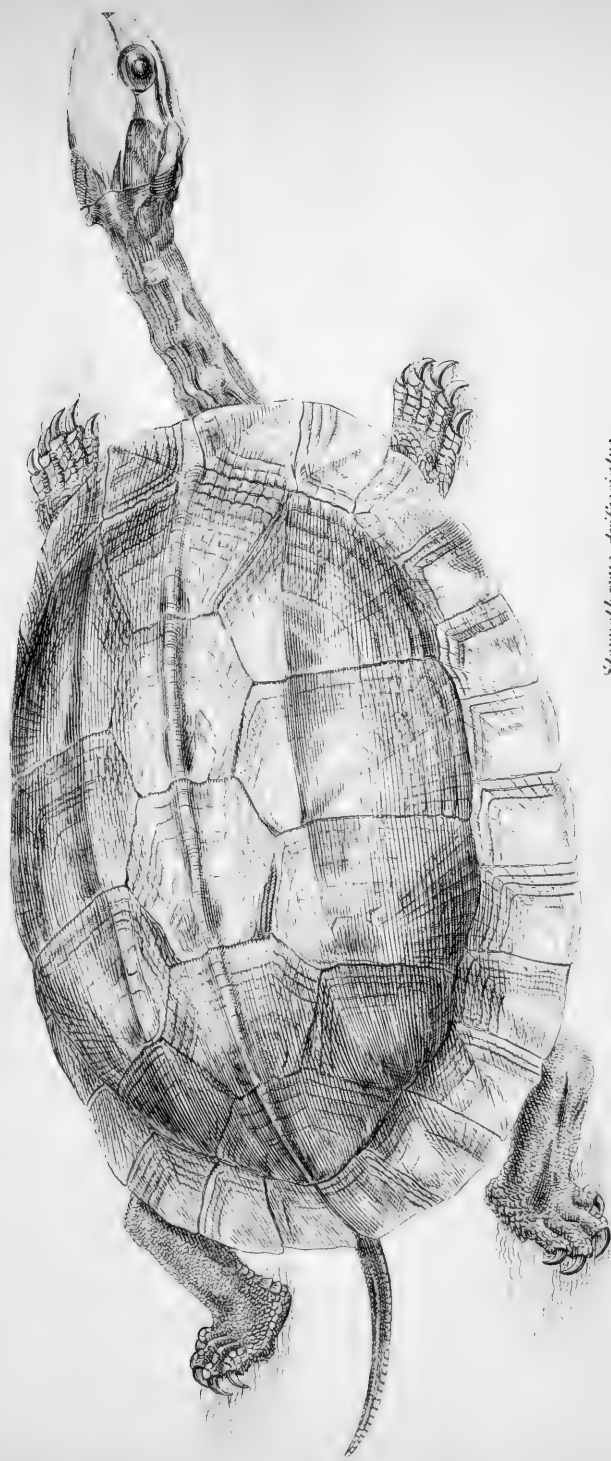
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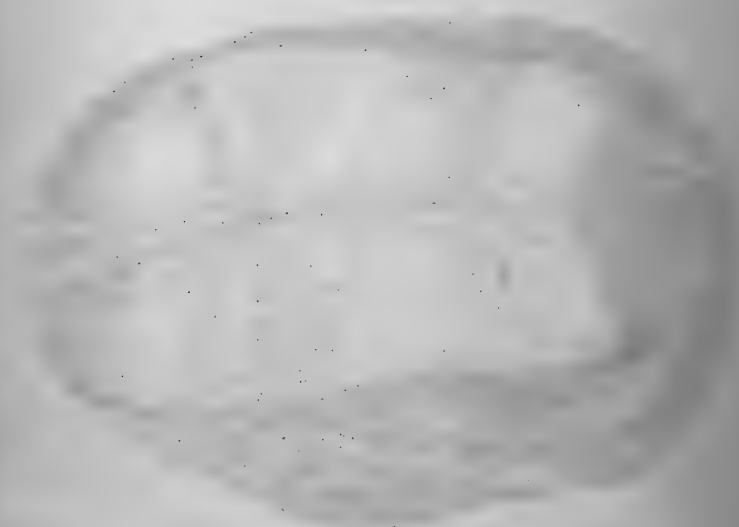
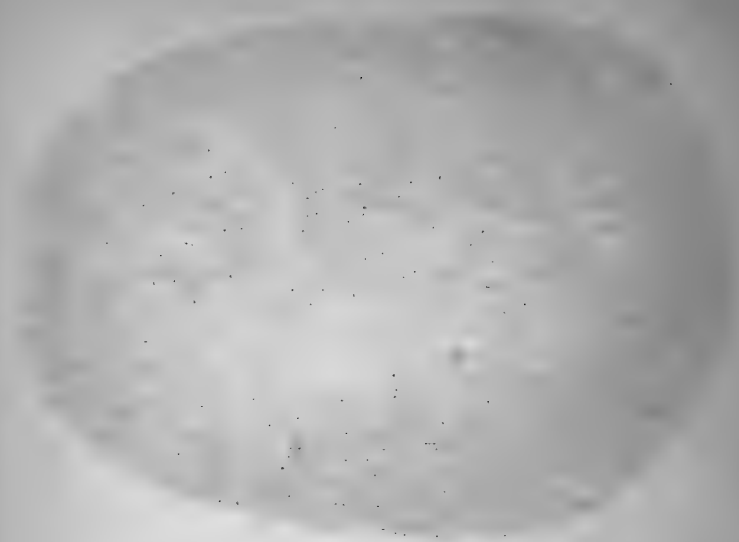
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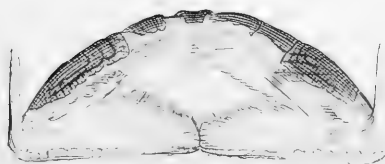
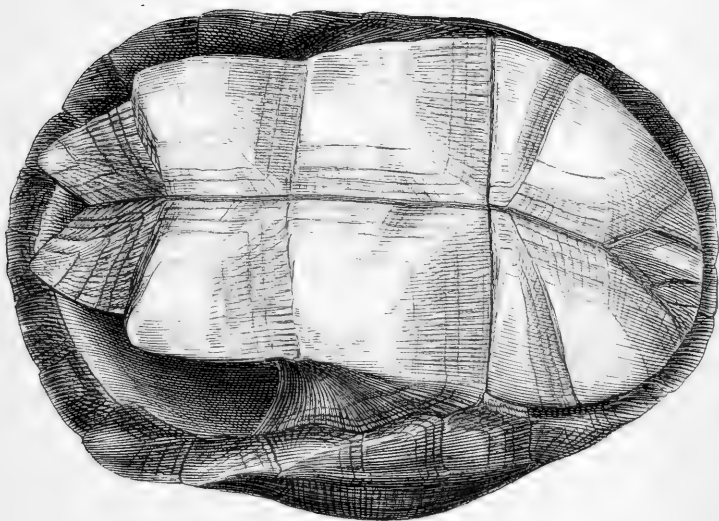
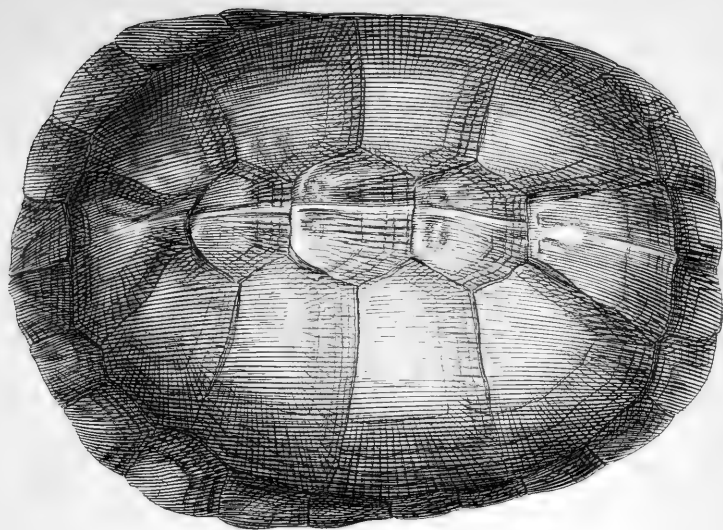
Octomeris angulosa.





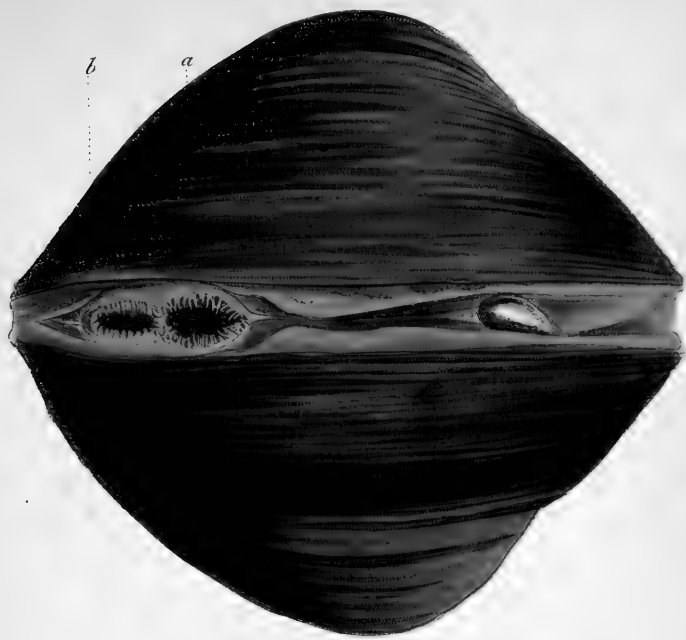
Sternotherus trifasciatus.



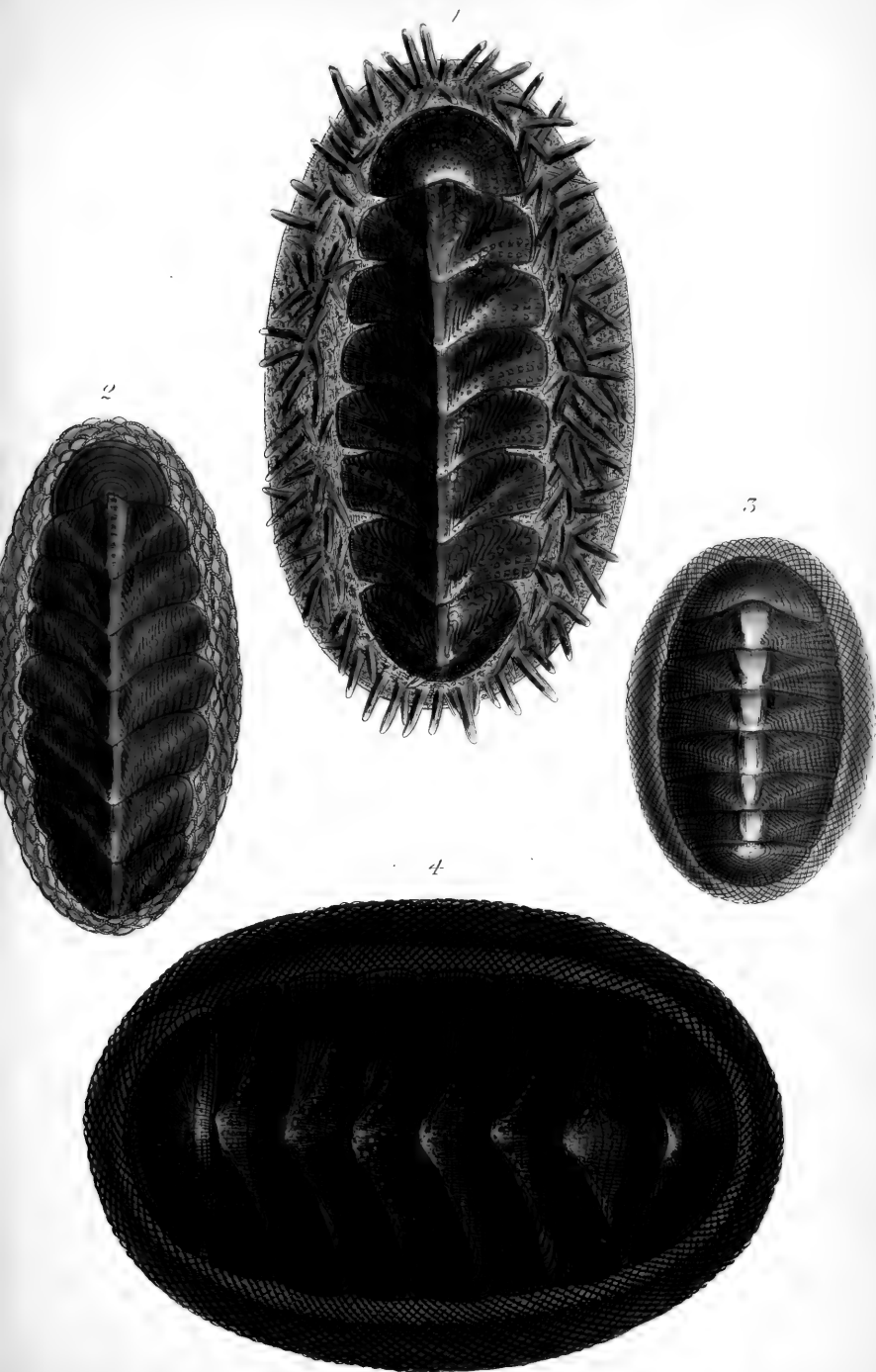


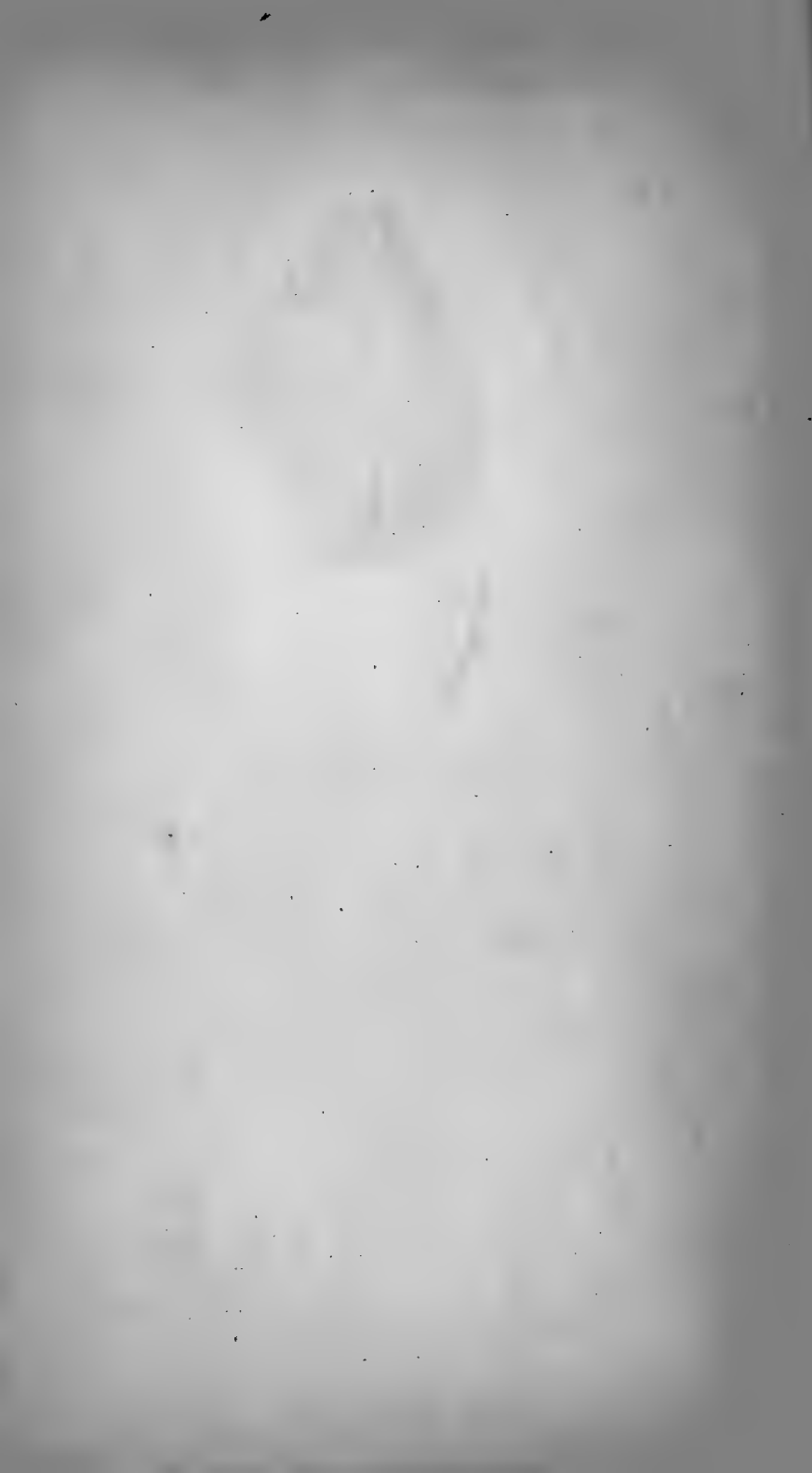
Sternotherus Leachianus.

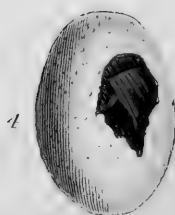




Isocardia Cor.











6

ev
v. d.



7



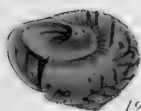
9



10



11



12



13

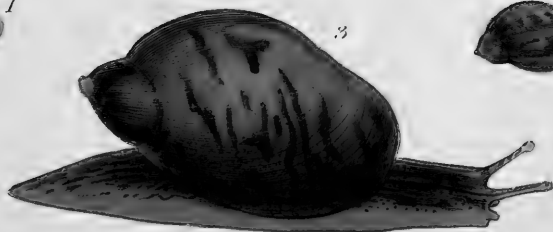


14

5



1



3



4



2



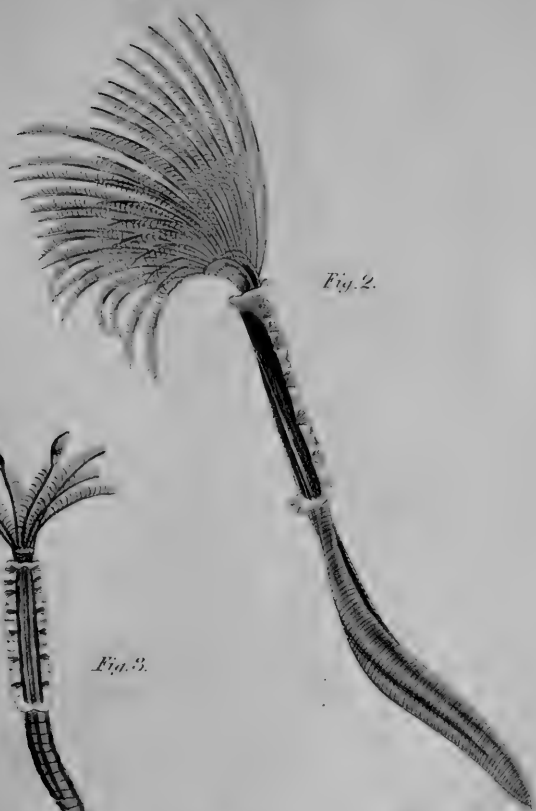


Fig. 2.

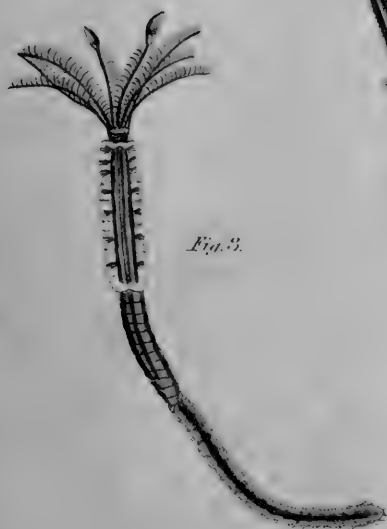


Fig. 3.

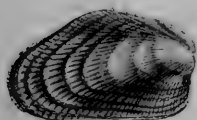
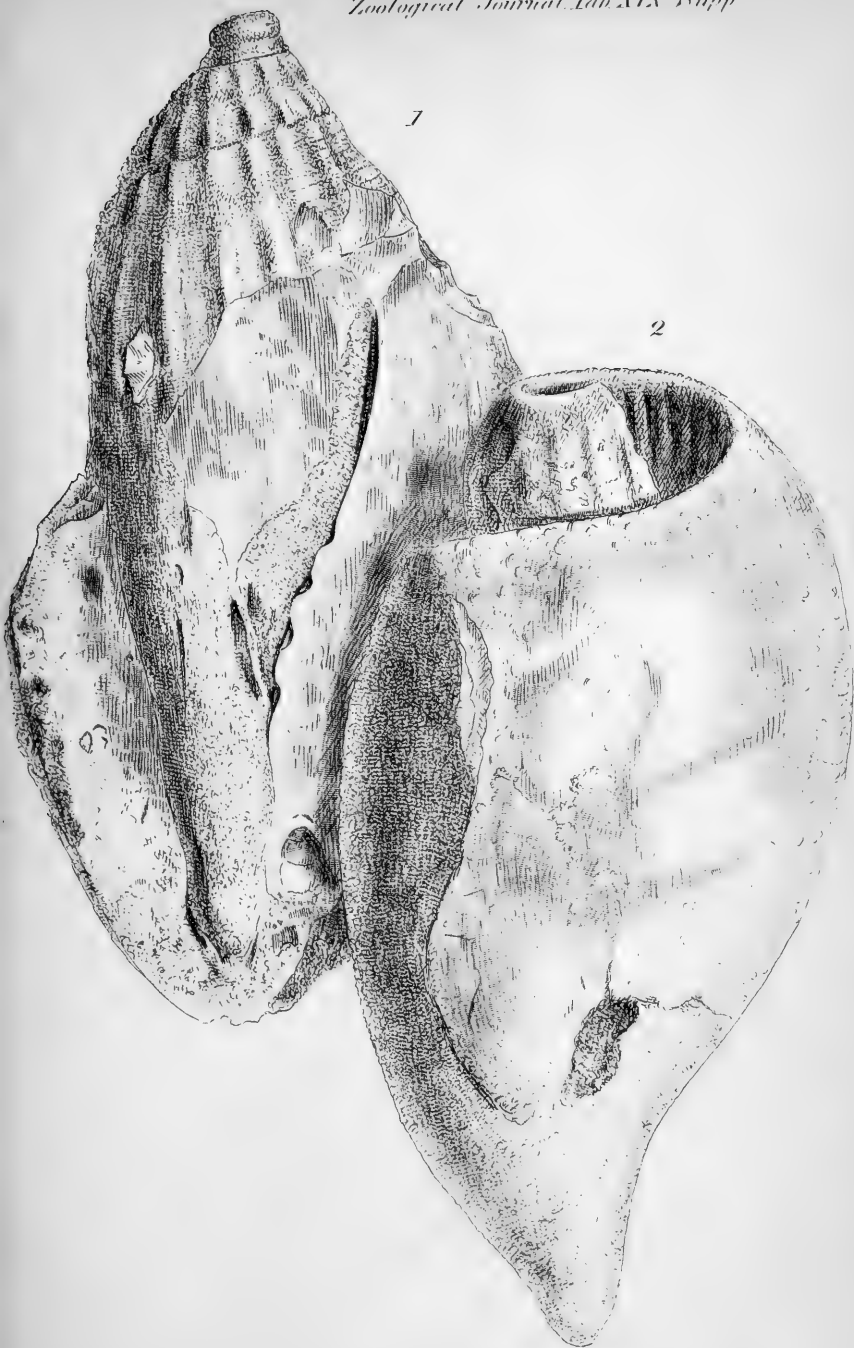


Fig. 1.



1. *Voluta antiqua* from St. Peter's Mountain.

2. A cast of the same.



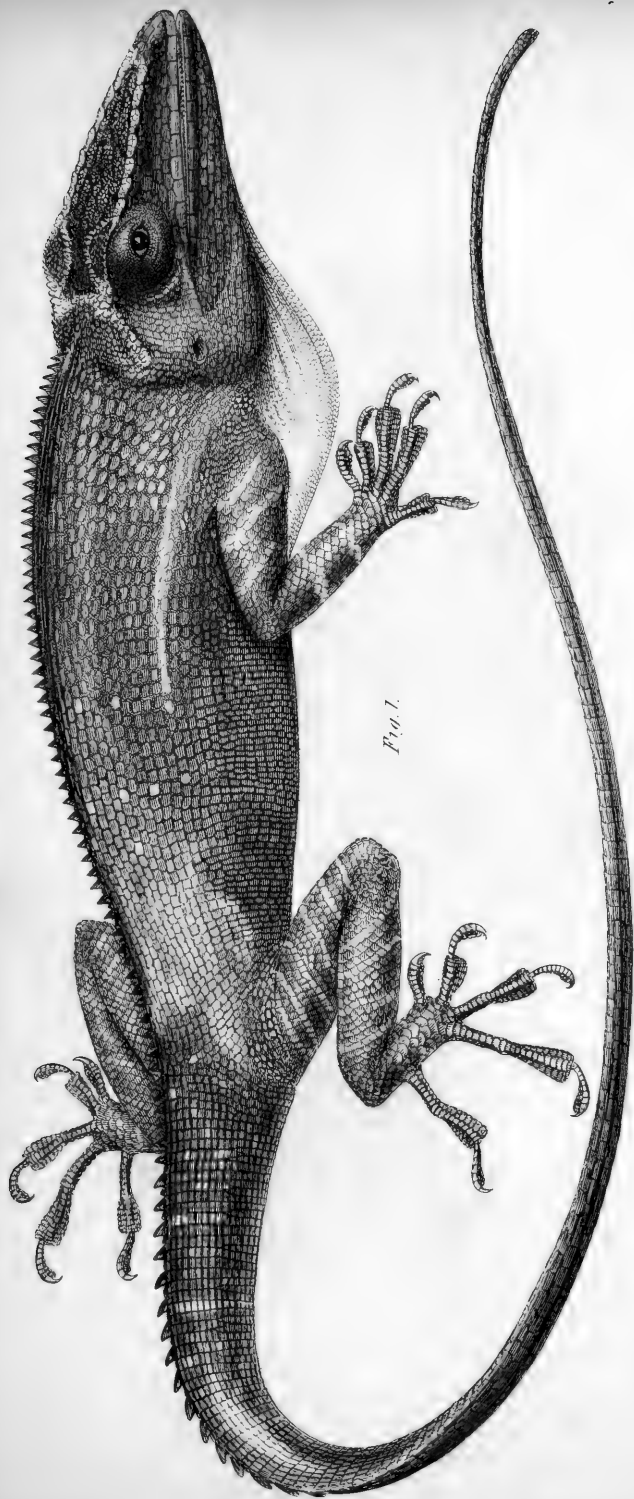


Fig. 2.







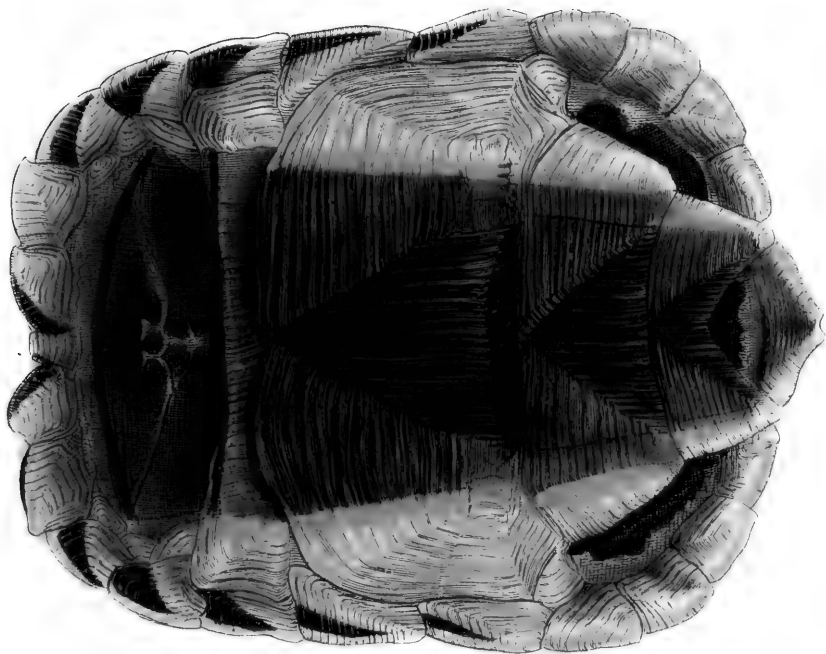
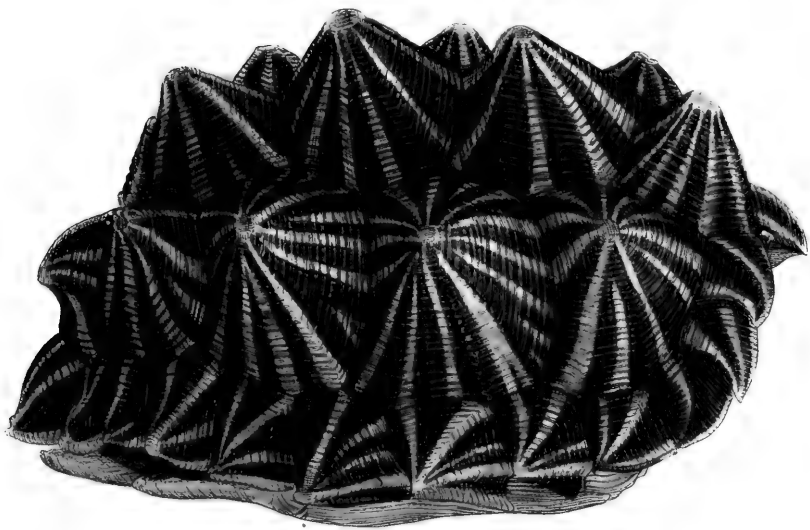




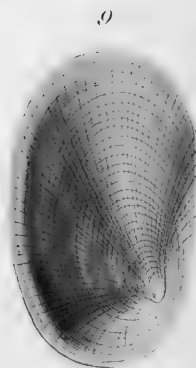
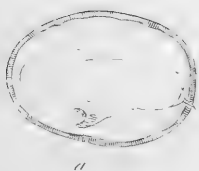


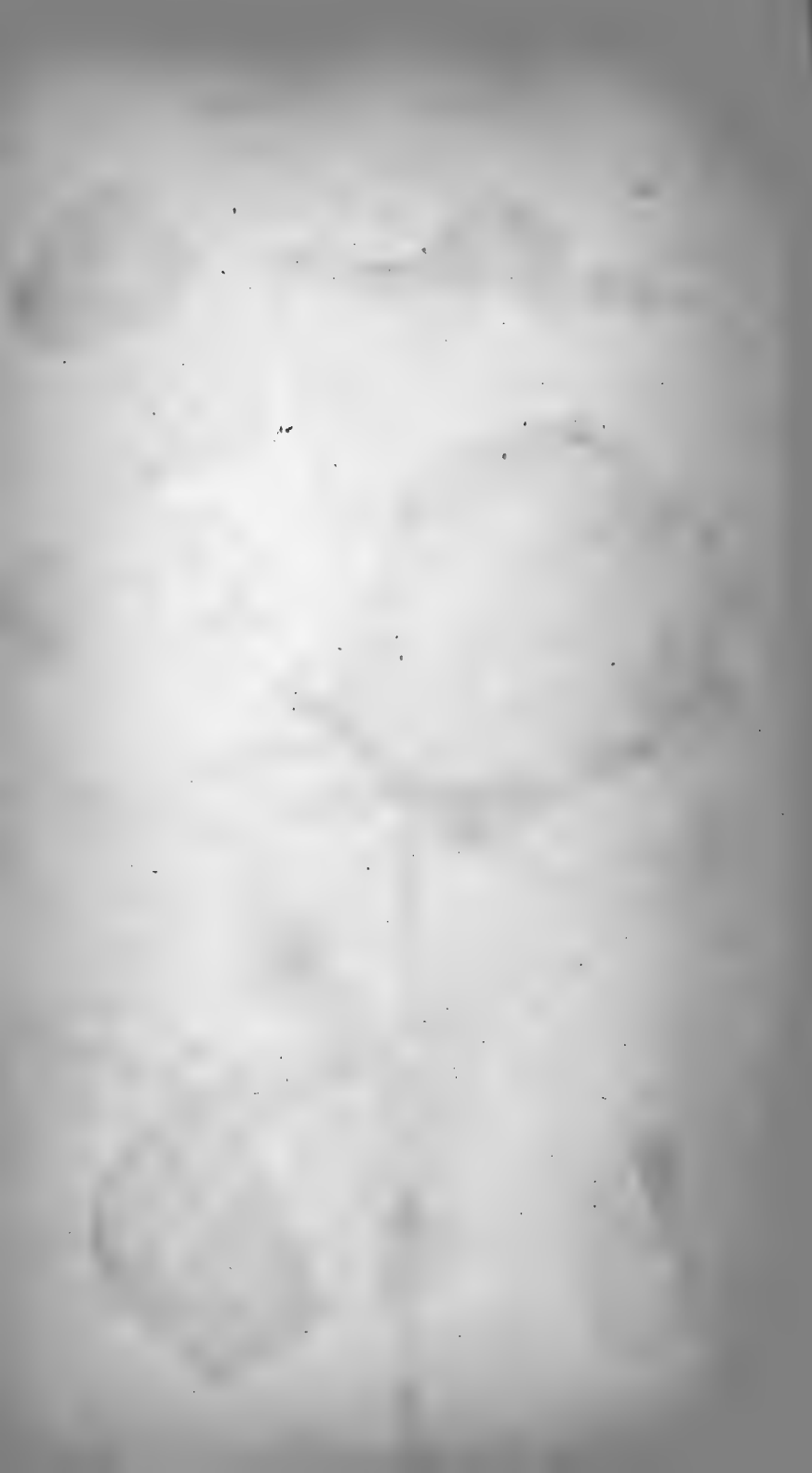


Testudo anatomica.









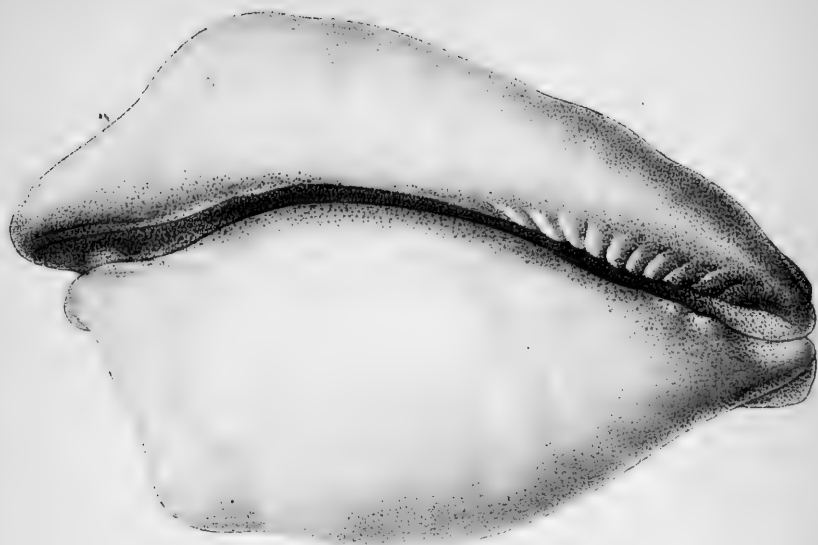




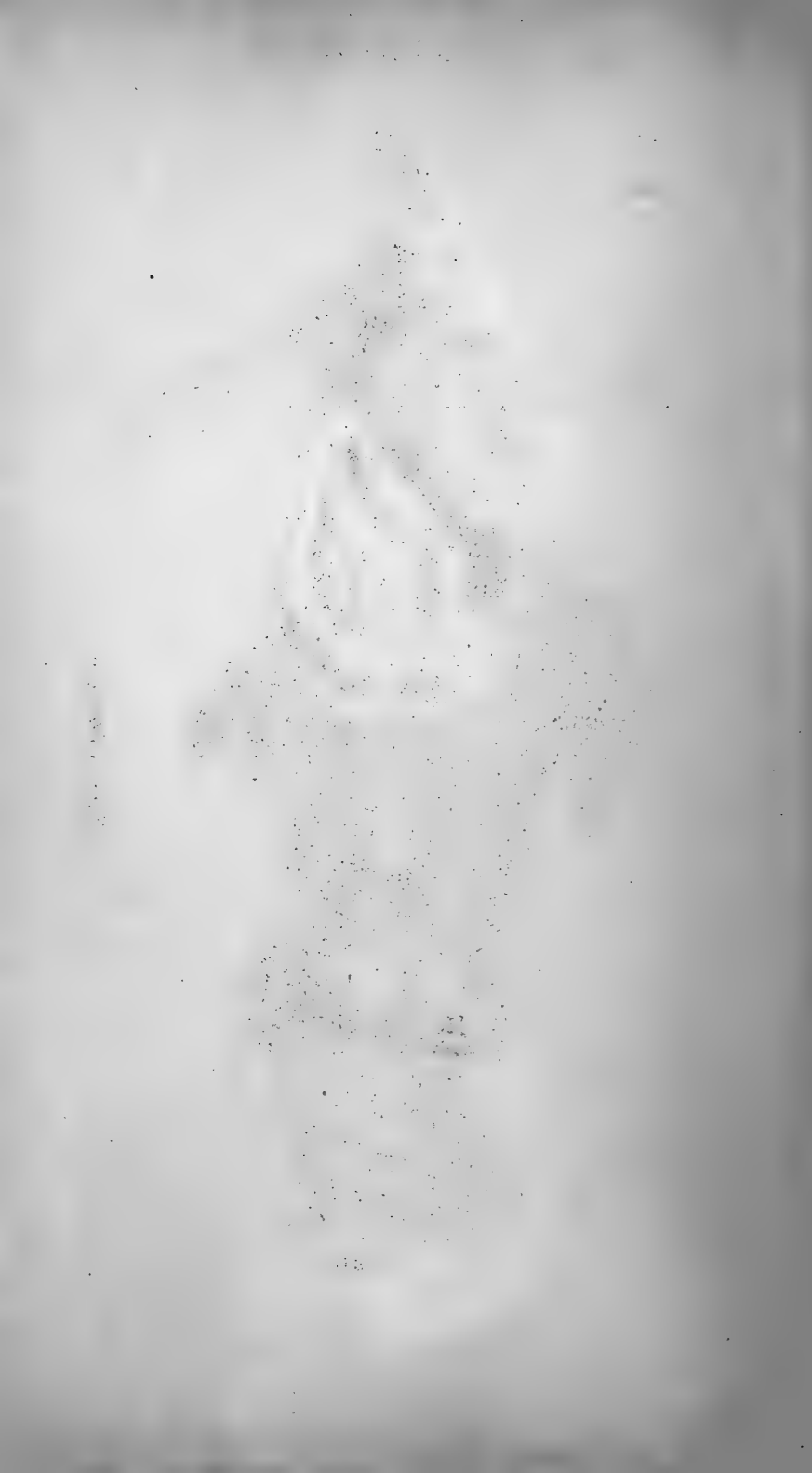


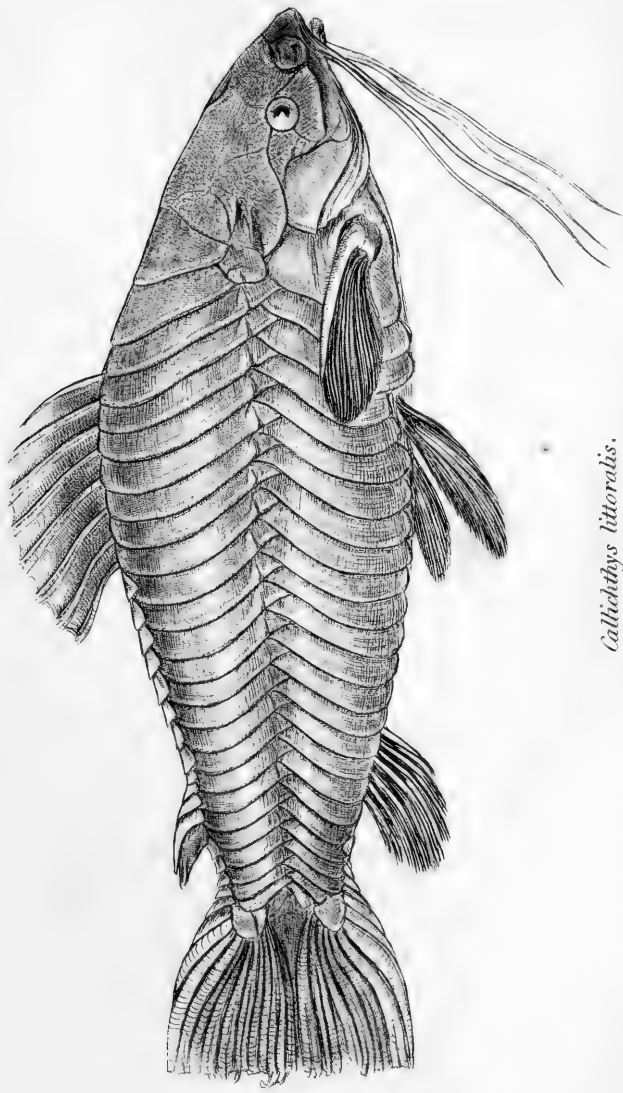












Callichthys littoralis.

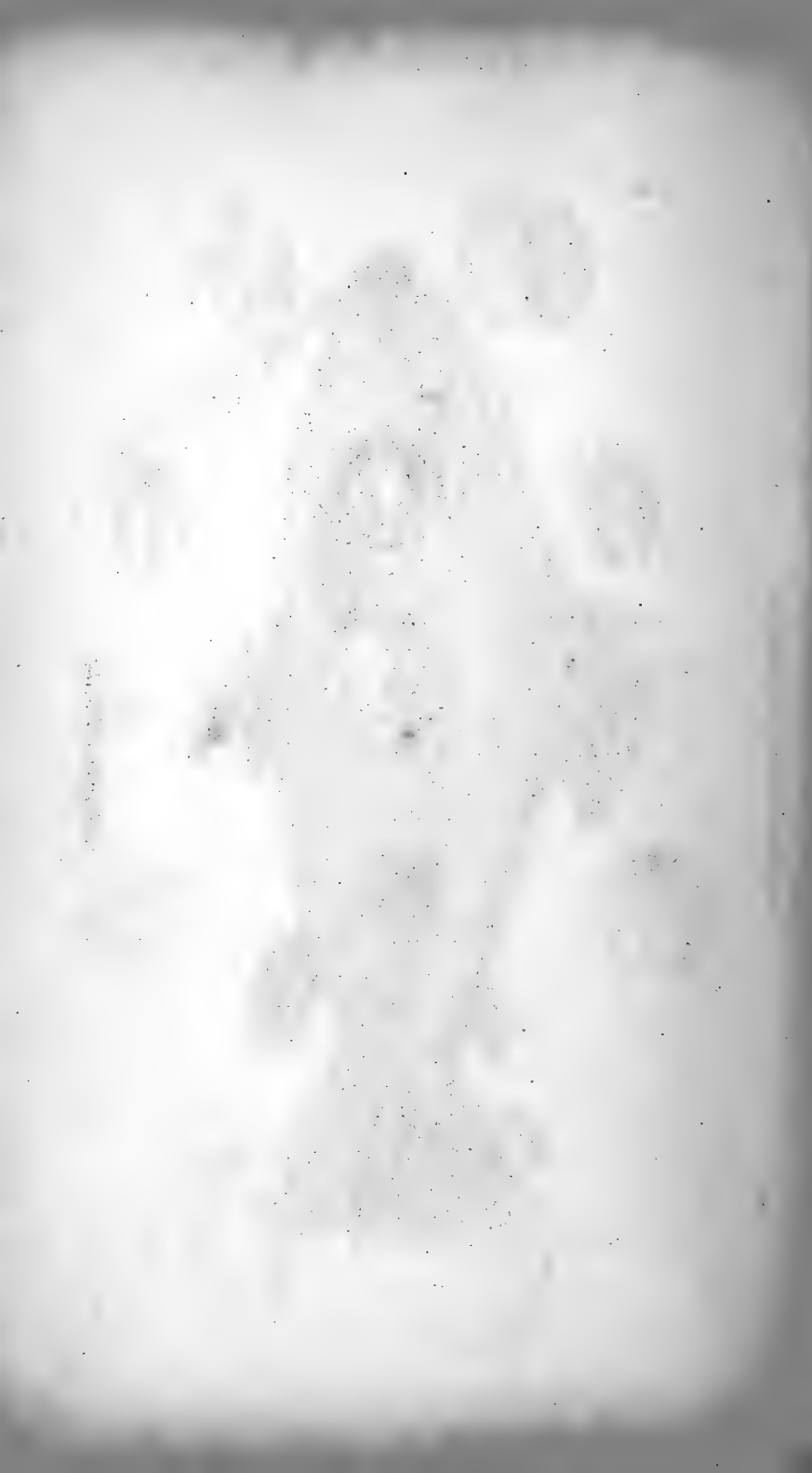




Fig. 1.



Fig. 3.



Fig. 2.



Fig. 4.

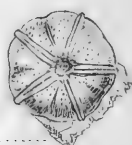
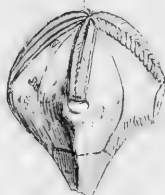


Fig. 5.



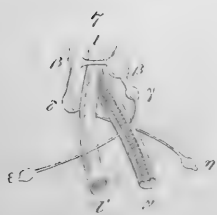
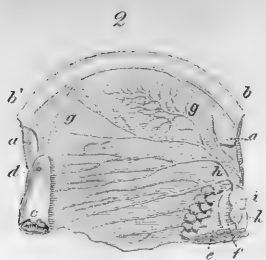
Fig. 6.



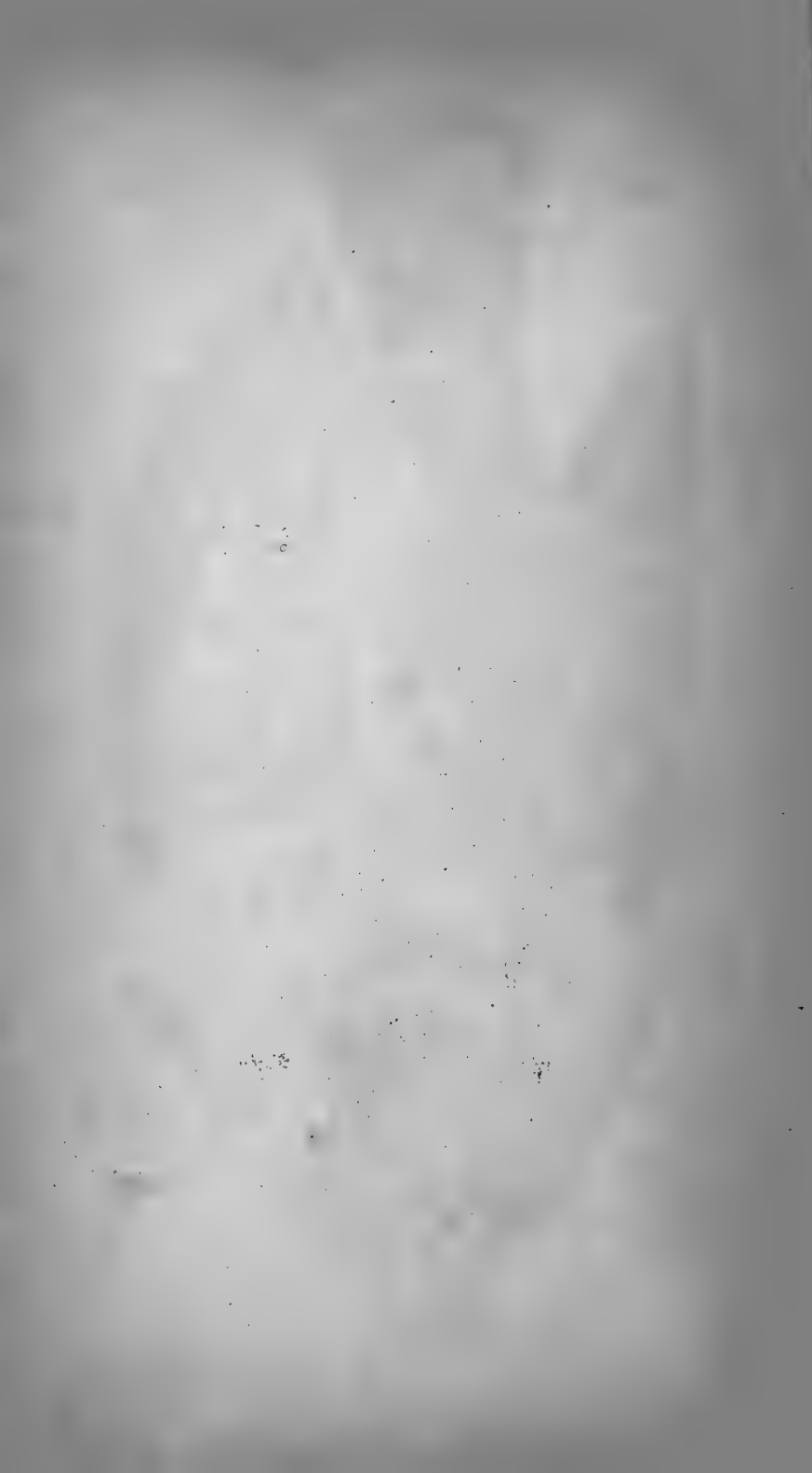
Fig. 7.

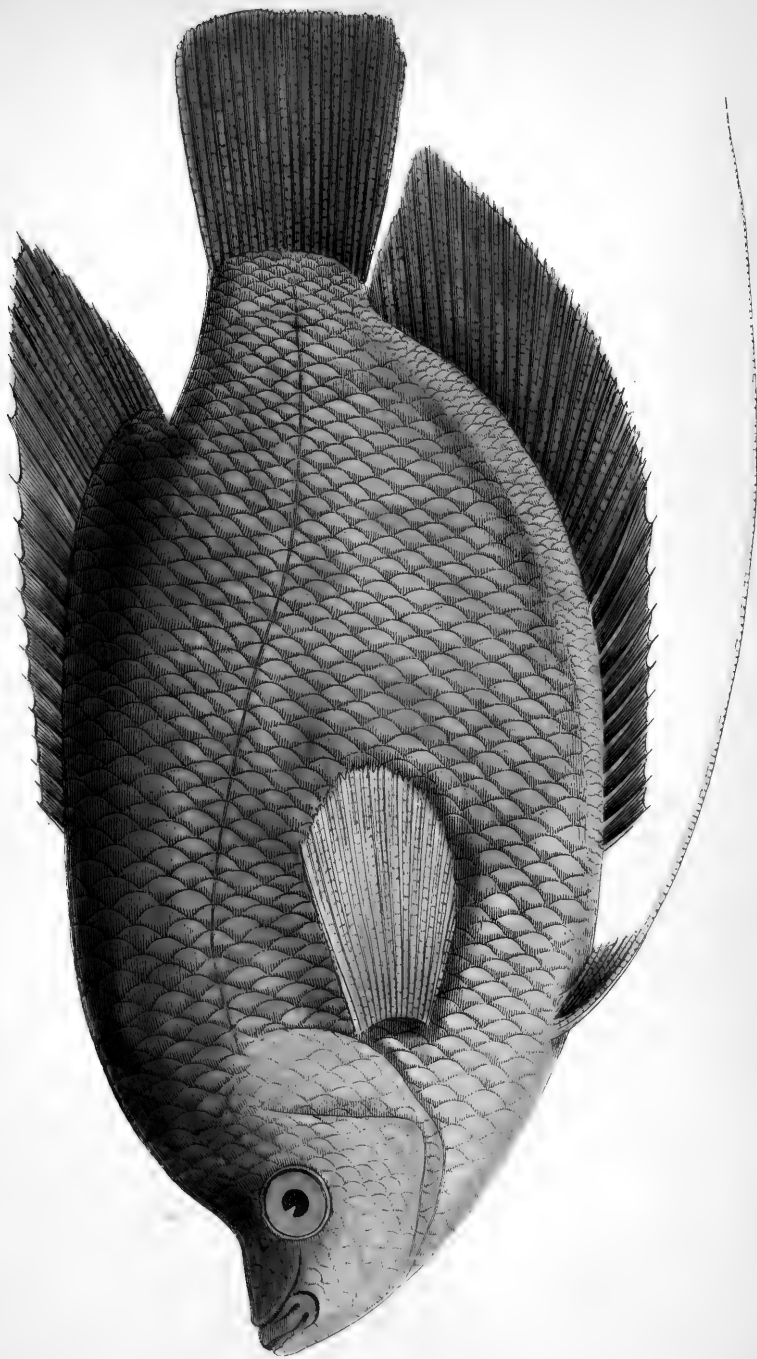


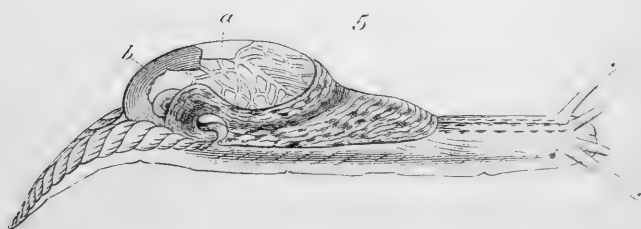
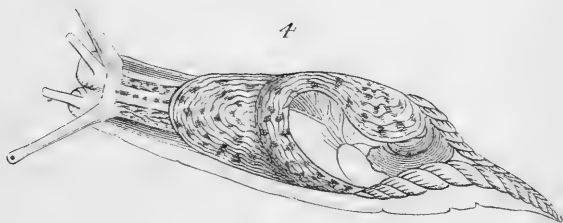
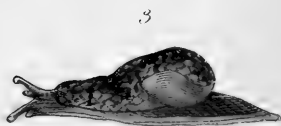
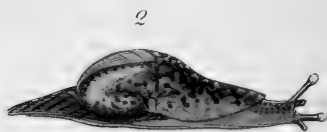














Felis Vepalensis.

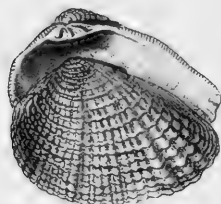




4



5



3



1



2



Fig. 1.



Fig. 2.



Fig. 3.

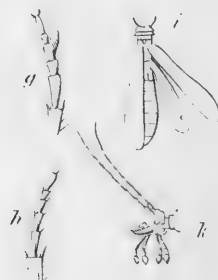


Fig. 4.

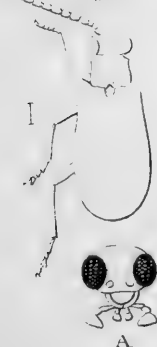


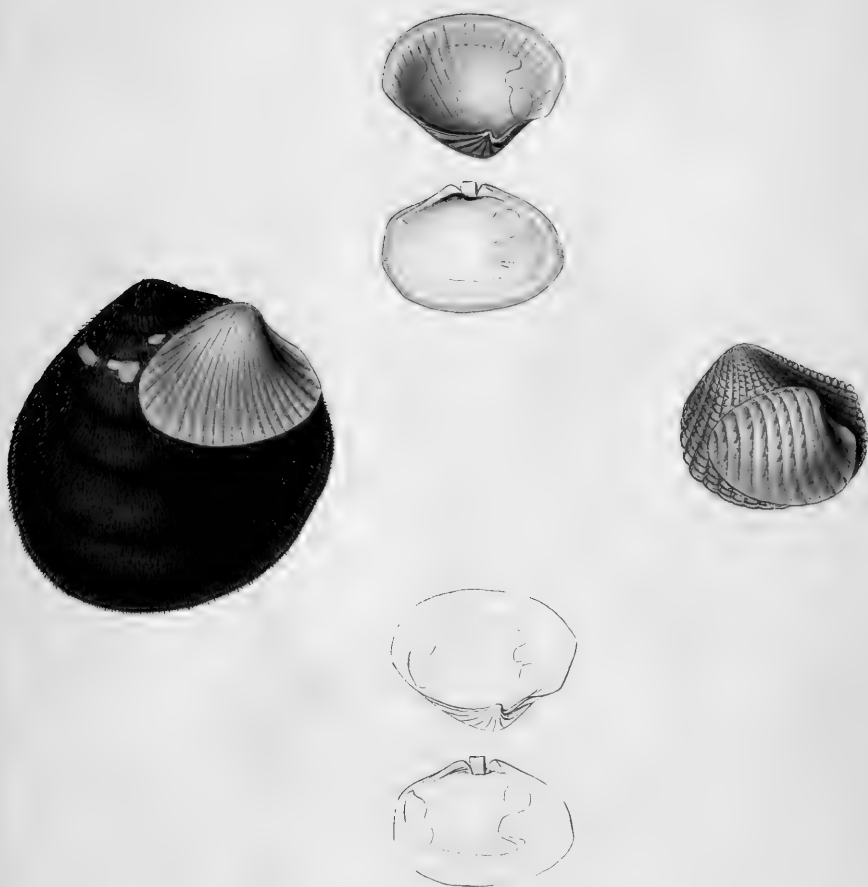
Fig. 5.



Fig. 6.





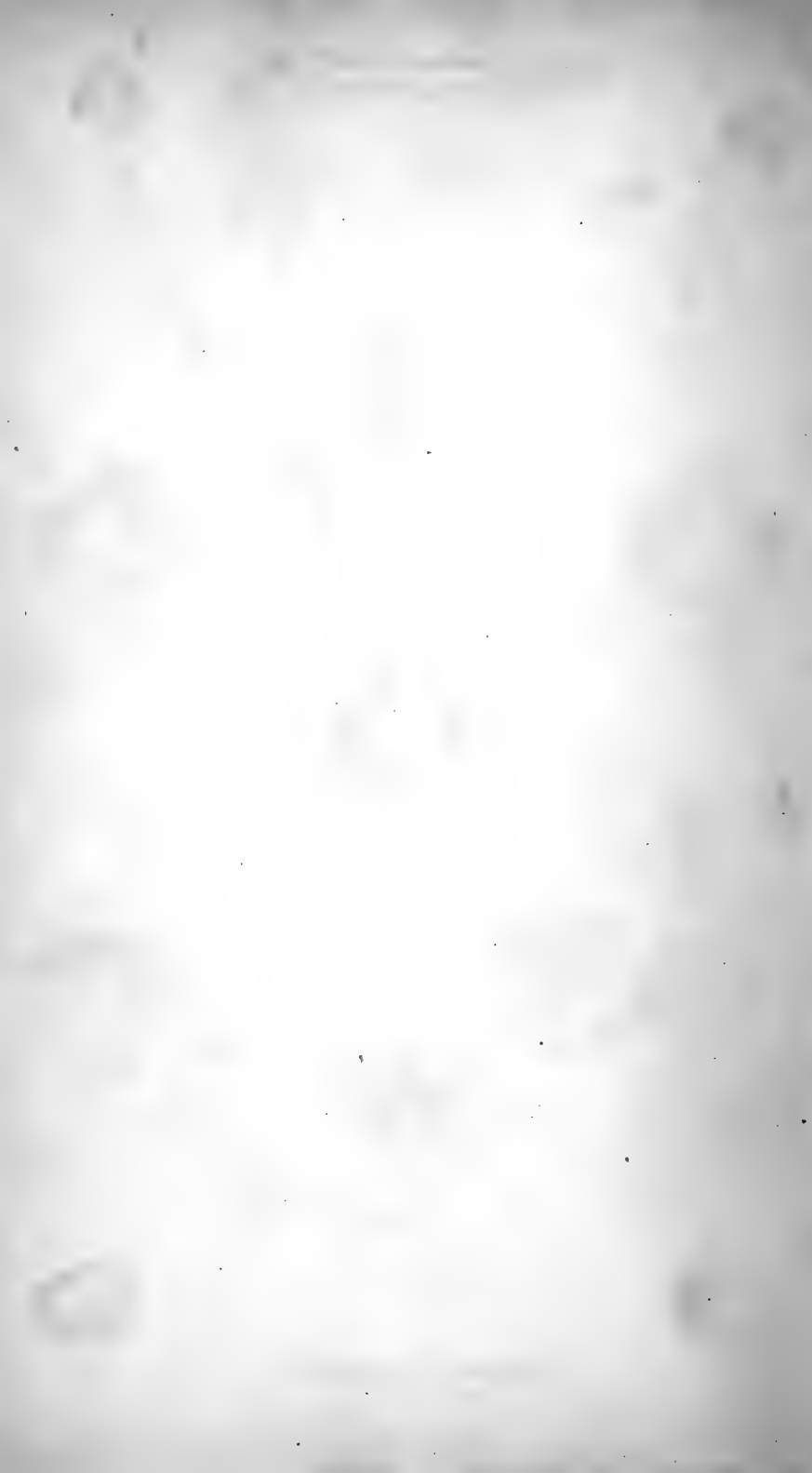


Myochama anomiooides.





Cleidotherrus chamoides.

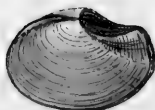




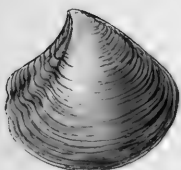
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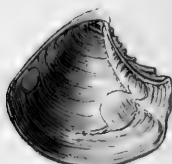
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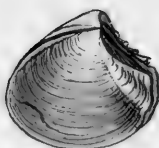
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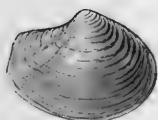
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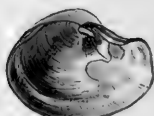
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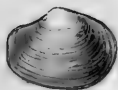


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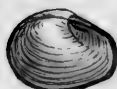


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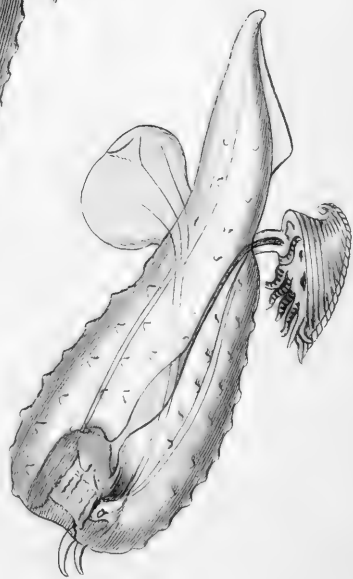
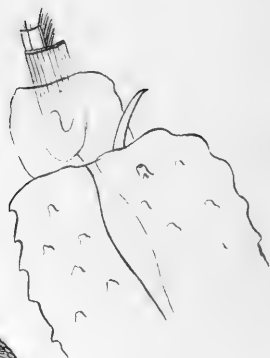
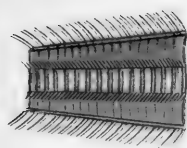
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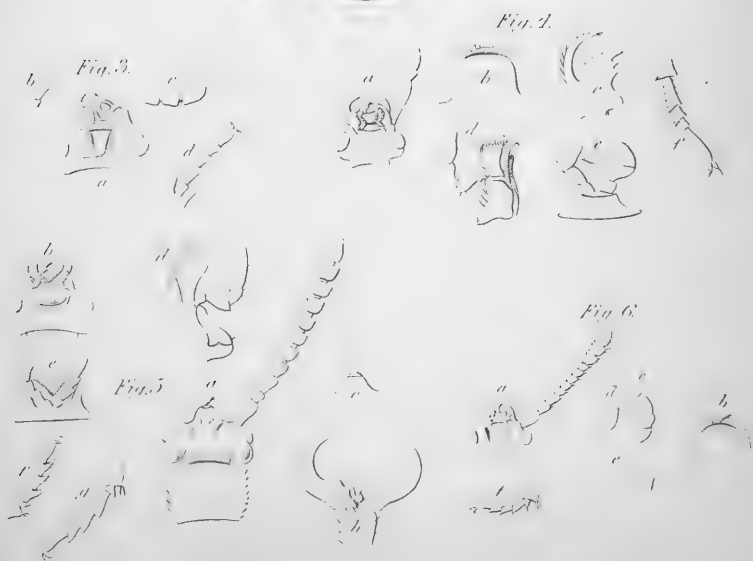
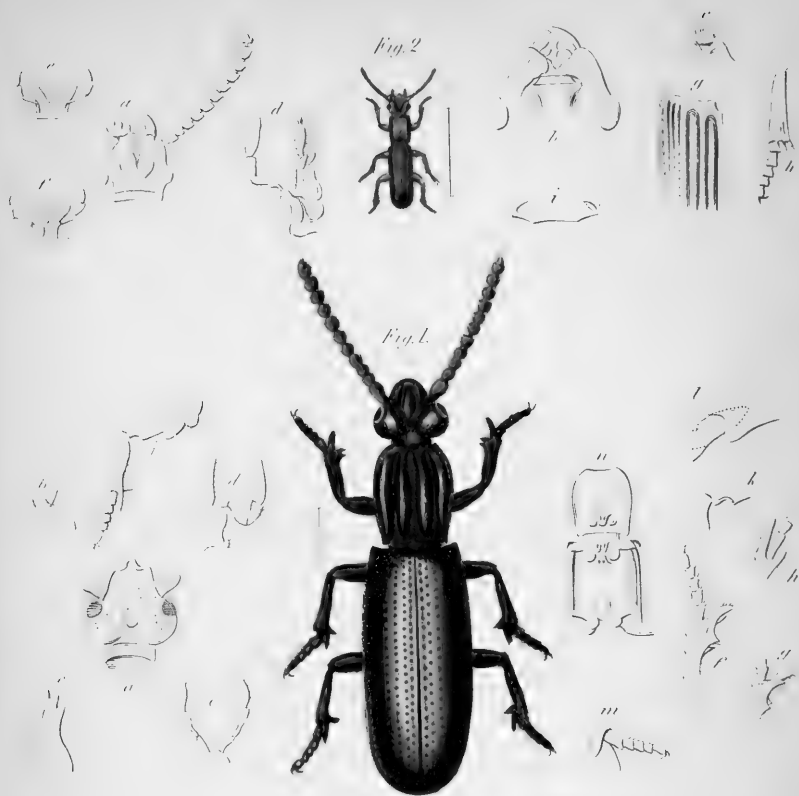
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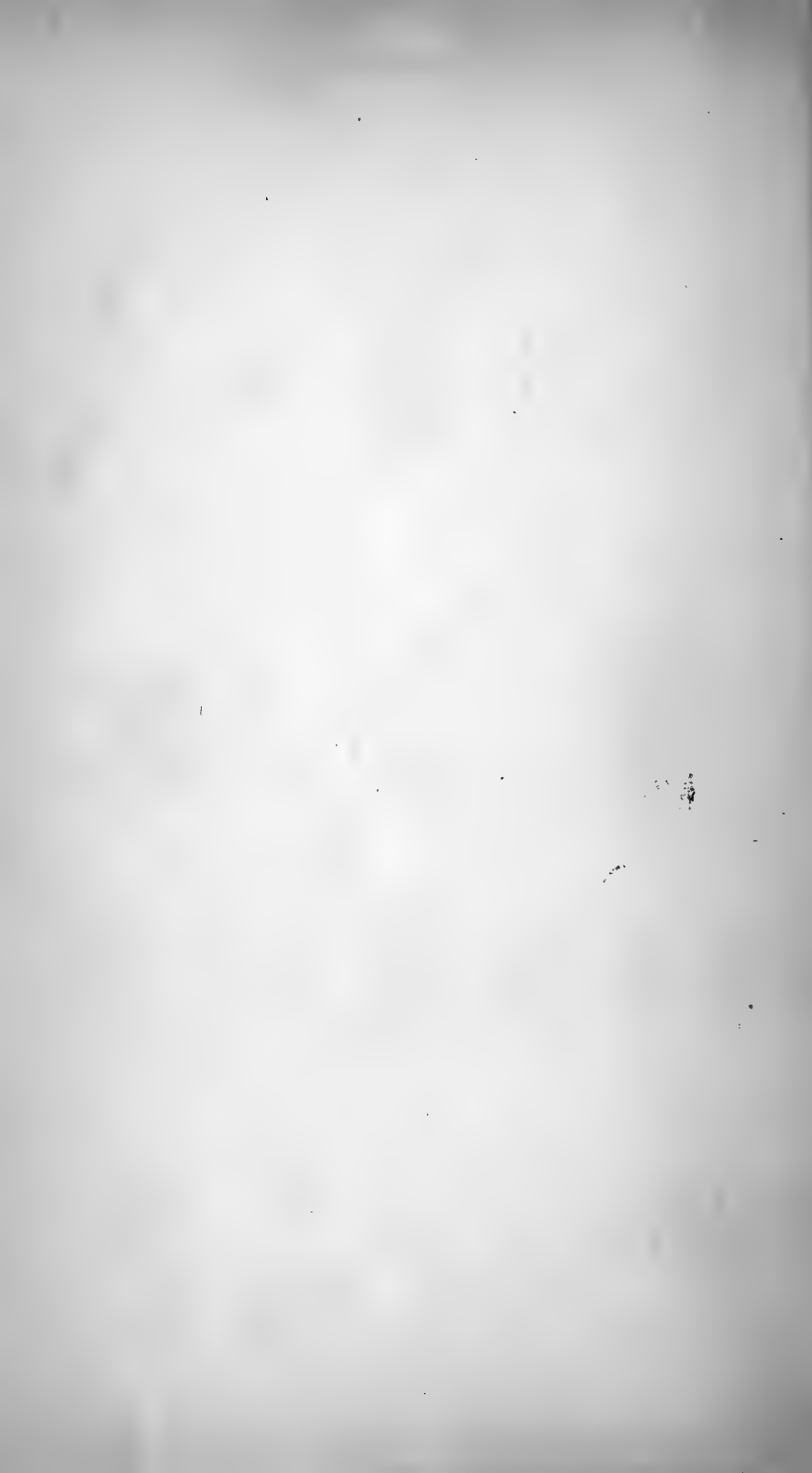


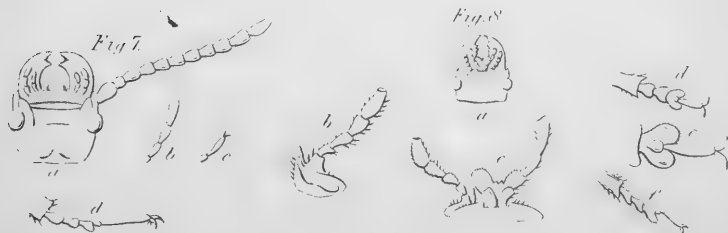
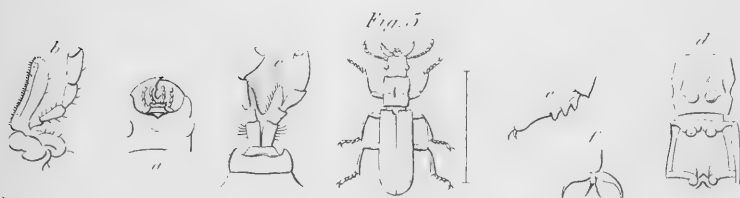
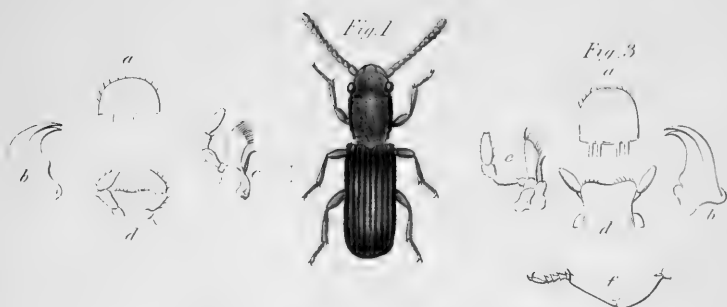












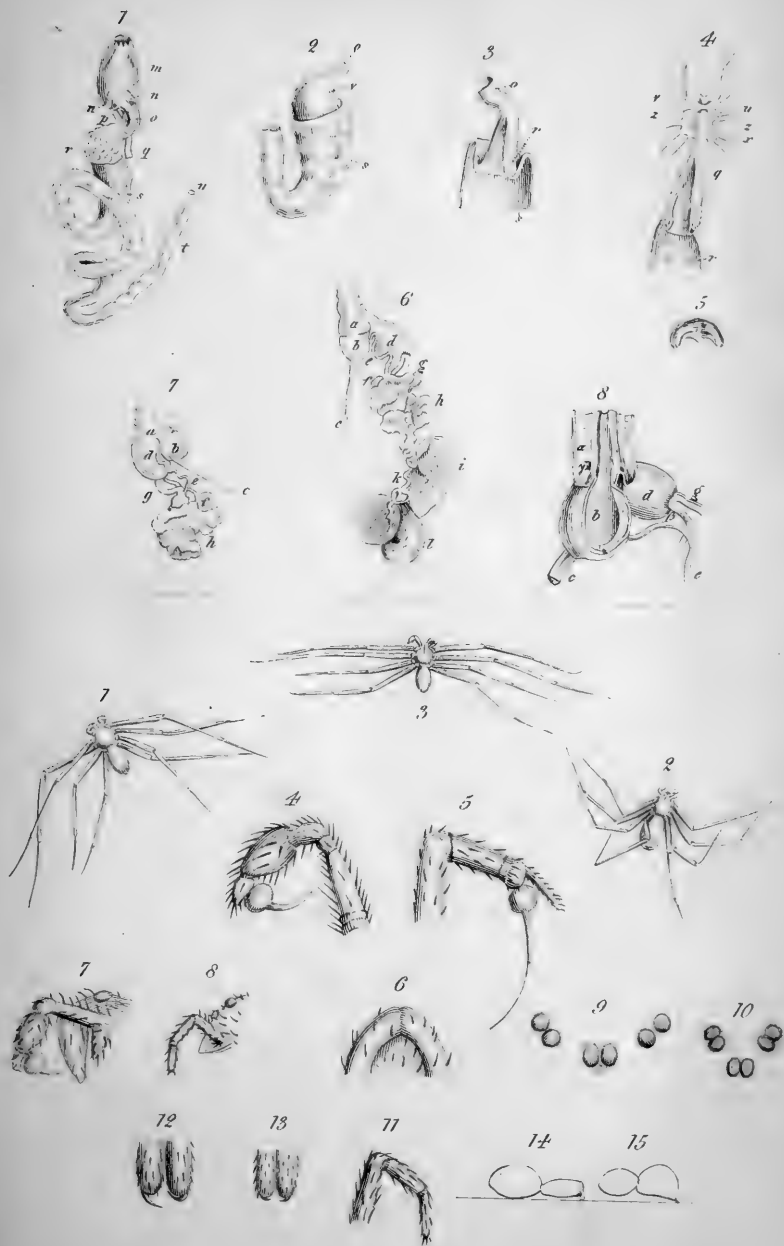
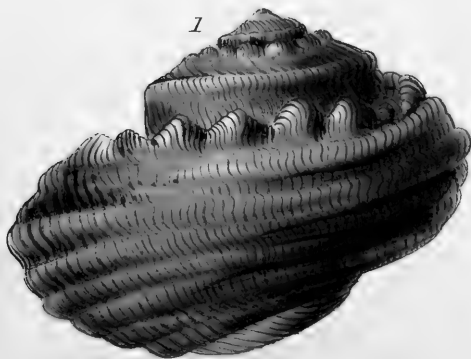
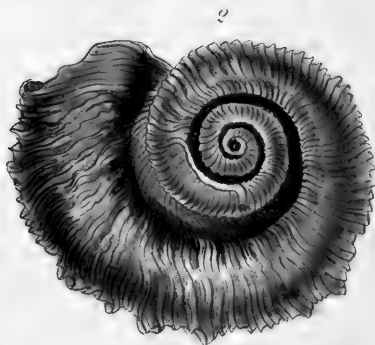
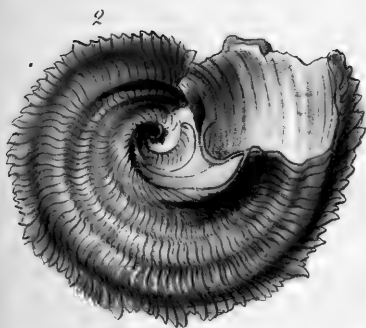
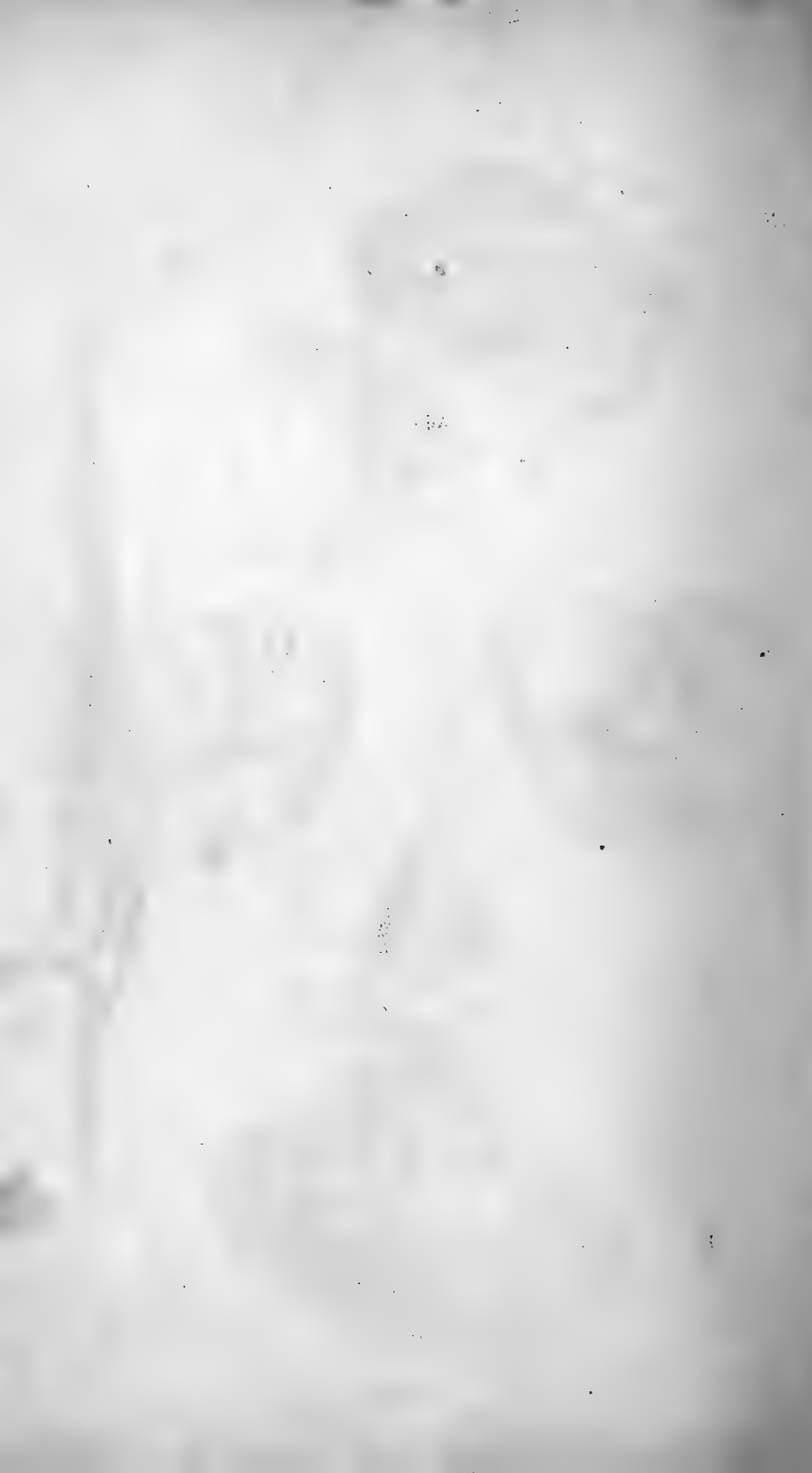
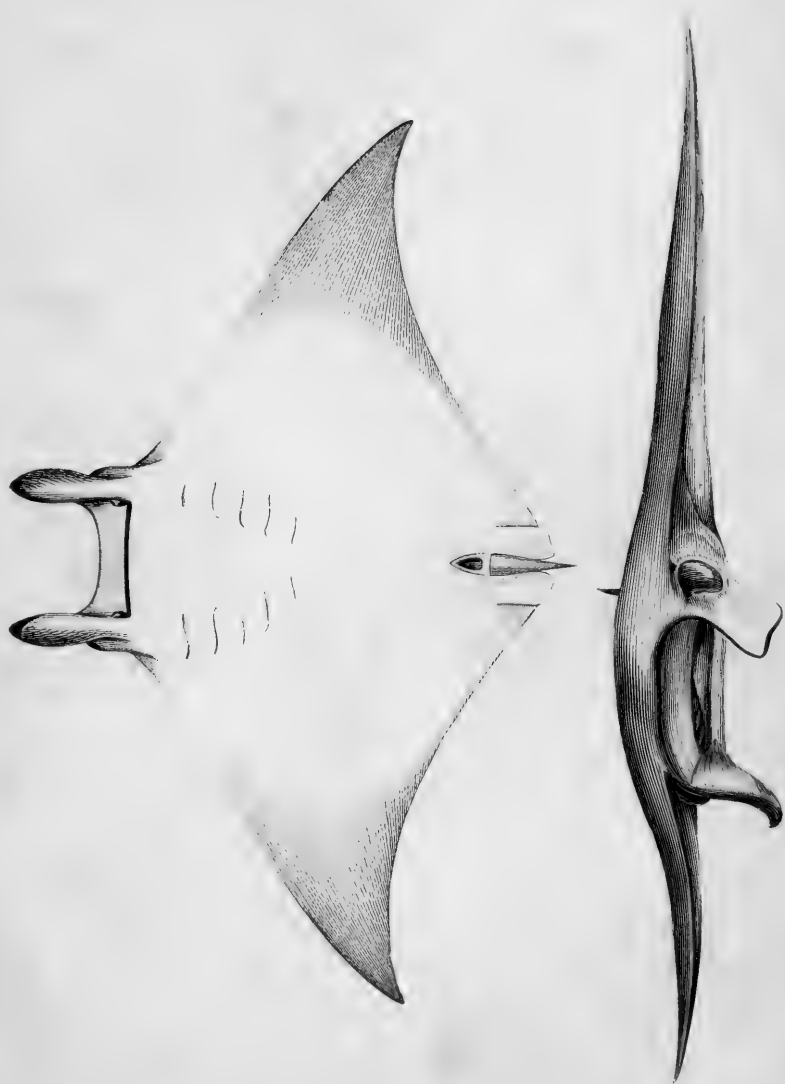


Fig. 1. *Turbo torquatus*, fossil.
 " 2. " *laniellus*, young.
 " 3. *Trochus Australis*.
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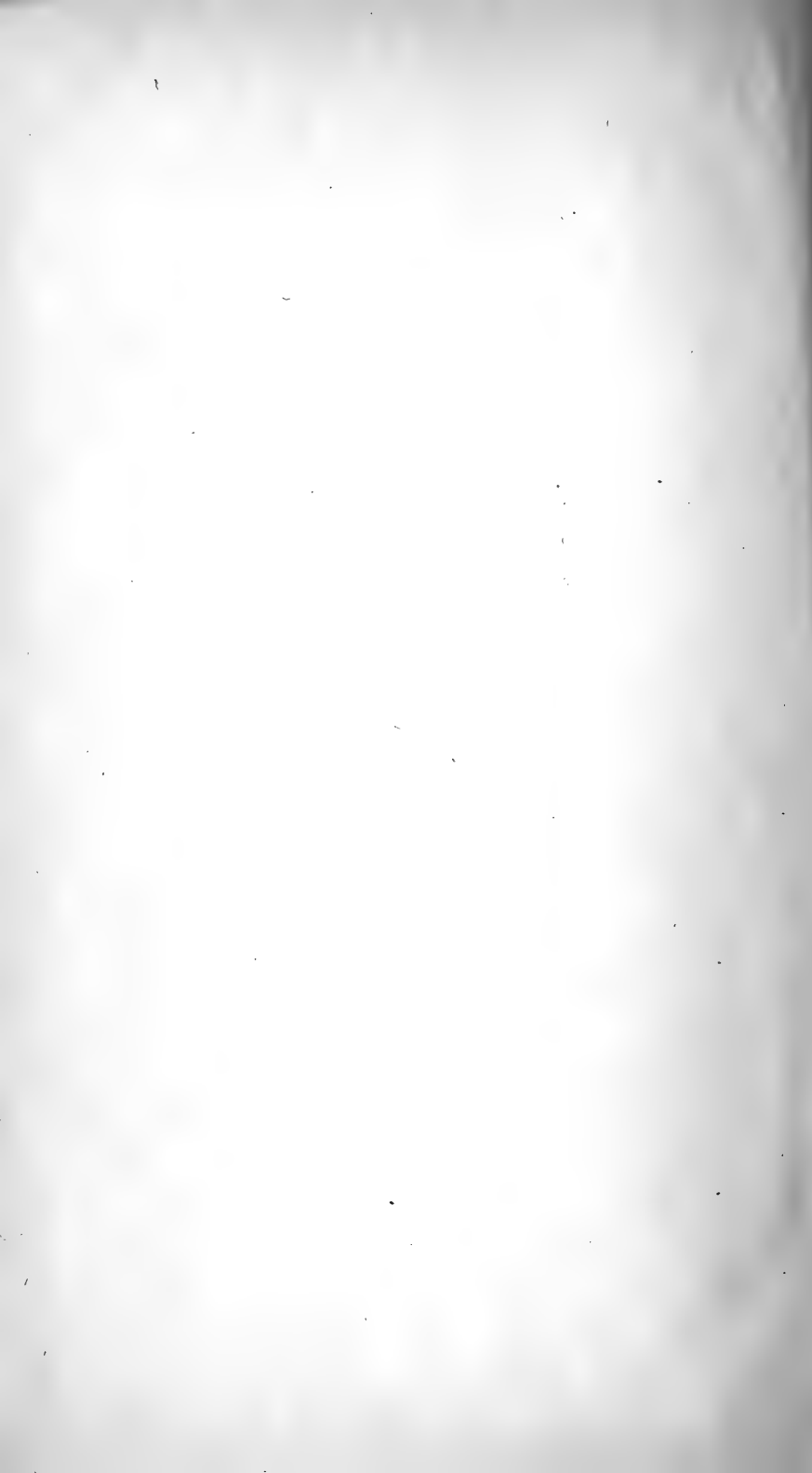
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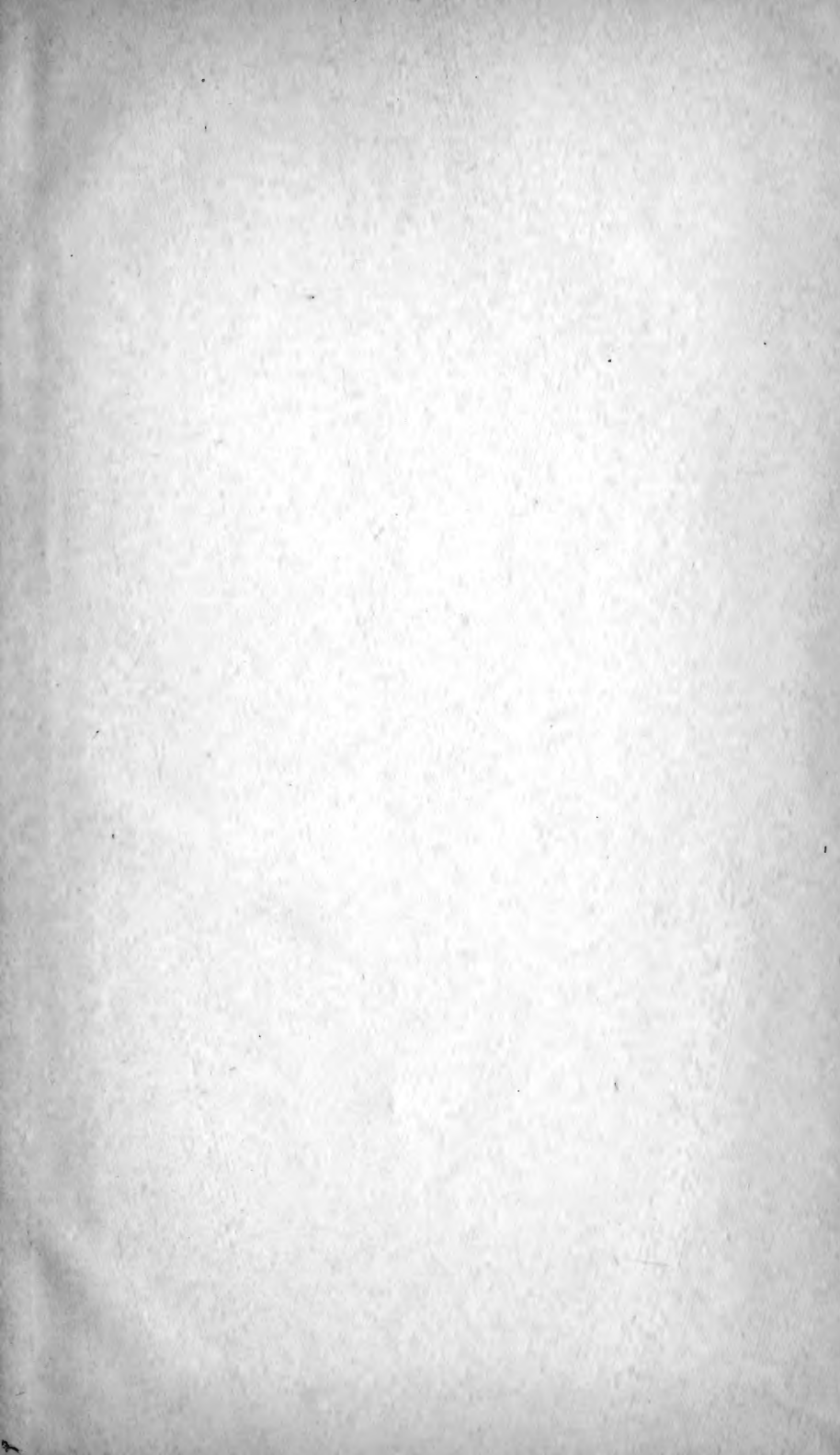
As the animal on which Mr. Berkeley's observations upon *Dentalium Gadus* of Mont. were founded proves on a reference to Mr. Lowe's Manuscripts to have been taken from a very young specimen of *Dentalium subulatum* of Deshayes, though hastily labelled "*Dentalium Gadus*," Mr. Berkeley feels it incumbent upon him to state the error into which he has unavoidably fallen.

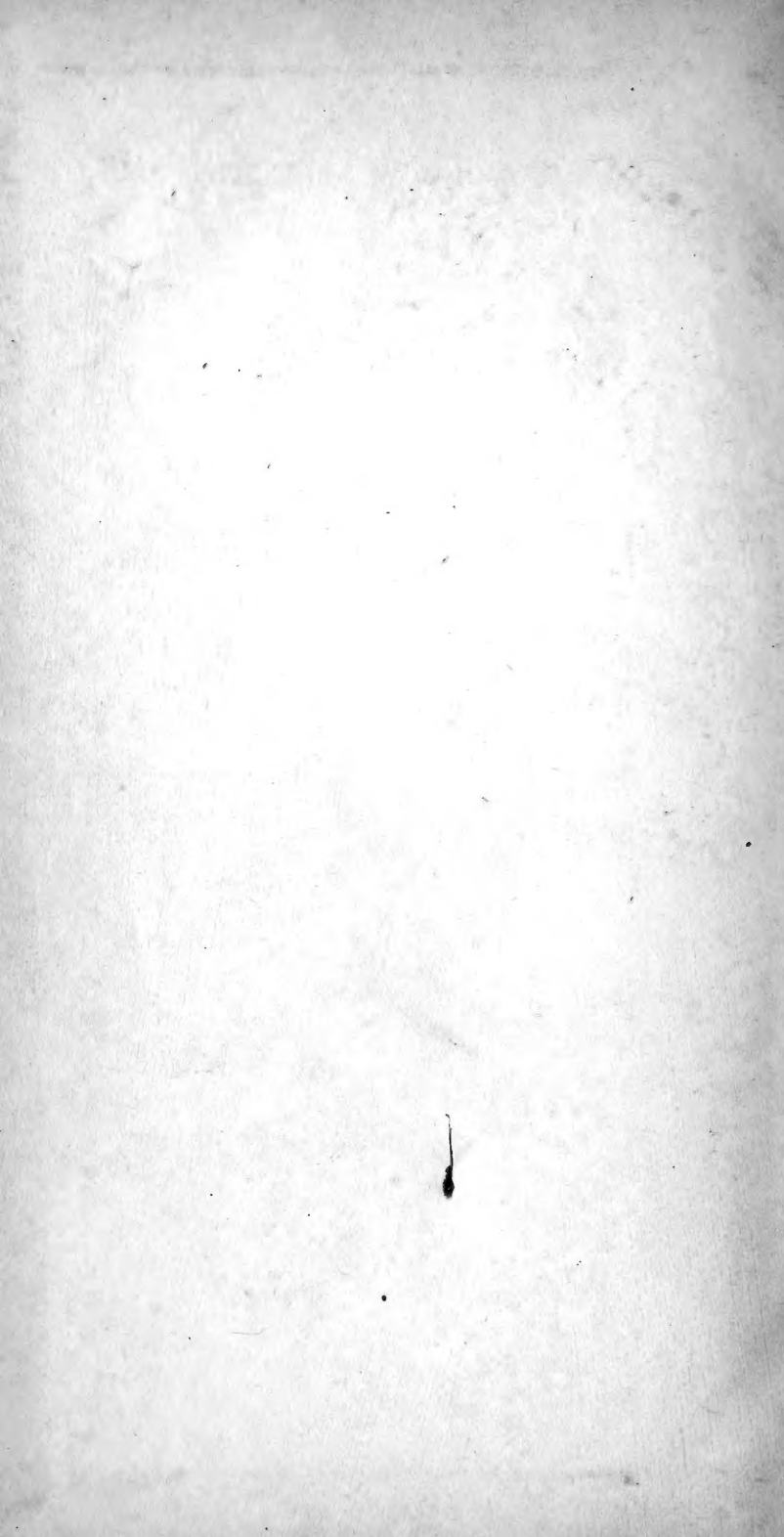
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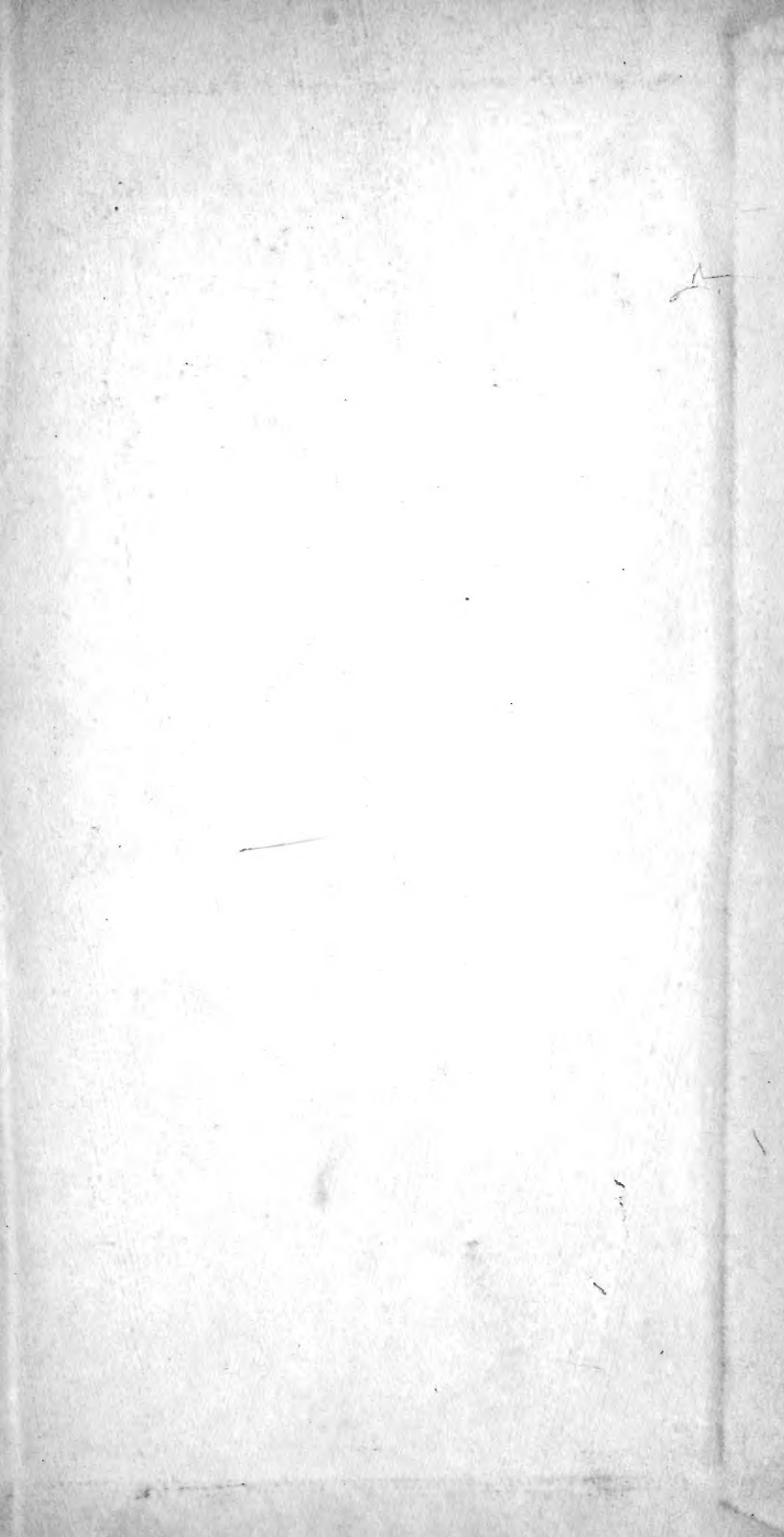












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