HANDBOOK

OF

ZOOLOGY

BY

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Trado quæ potui.

IN TWO VOLUMES.

VOLUME THE FIRST.

(*INVERTEBRATE ANIMALS.*)

TRANSLATED FROM THE SECOND DUTCH EDITION

BY

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SYSTEMATIC

ARRANGEMENT OF ACALEPHÆ.

CLASS III.

ACALEPHÆ.

GELATINOUS animals, swimming freely. Stomach included in the parenchyme of the body, without an abdominal cavity; canals arising from the stomach, filled with water. Ovaries and testes in one and the same individual or the sexes distinct without organs of copulation. Vestiges of a nervous system not always distinct. Arrangement of parts usually quaternarian.

ORDER I. *Siphonophoræ.*

[Swimming Polyps without tentacles round the mouth, attached to a common stem of variable length, and moving freely by means of special swimming apparatus, with prehensile filaments, feelers, and protective covers or bracts, or some only of these organs, attached mediately or immediately to the same common stem.]

This first order includes the *Acalèphes hydrostatiques* of CUVIER and a part of his *Acalèphes simples.*

Family I. *Velellidæ* or *Chondrophoræ.* Common body, supported by a cartilaginous[1] lamina, which is cellular internally.

The part of the body which faces upward is supported by a disc, which in *Porpita* is even in some degree calcareous, and con-

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[1 The disc contains horny substance, not cartilage, according to LEUCKART.]

tains cells which are full of air. Above, this disc is covered by the integument alone; below, it sustains all the parts of which the [compound] animal consists.

[The shell of *Velella* with its horizontal and perpendicular plates consists of a single piece. The thicker horizontal portion is formed of two laminæ connected by perpendicular concentric pieces, so that annular canals are formed which are filled with air. These canals communicate with each other in *Velella*, but not in *Porpita:* in both they open externally by many minute pores on the upper surface. The soft parts constitute a mantle which covers the shell and projects beyond its edge by a free border. At the inferior excavated portion of the shell, the mantle has on its outside the attached polyps and appendages, on the inside the large liver.

The polyps are of two sorts, a single large and central polyp, and many small ones disposed around it in irregular rows. They have been designated "stomachs" and "suctorial tubes." But observers do not agree respecting their function. Lesson attributes to both sets a digestive power, *Voyage de la Coquille*, pp. 49—56, and *Acalèphes* p. 561 : whilst V. Siebold *Vergl. Anat.* s. 63, note, thinks that the smaller polyps alone discharge the office of digestion, and consigns the large one to the respiratory system : and Hollard *Ann. des Sc. Nat.* T. III. 1845, p. 250, says that the large central pouch is the stomach and the small ones *canaux aquifères.* Koelliker however assures us that he has found small *crustacea* both in the large and the small tubes, and has seen the residue of digestion pass from them all indifferently. Consequently we conclude with him and others, that the *Velellidæ* are colonies or compound animals.

The liver is a large brownish mass placed above the central stomach : it fills the inferior cavity of the horizontal plate. It is a collection of fine canals formed of homogeneous membrane lined with brown cells. A certain number of the canals branch from two openings in the base of the central polyp : they frequently anastomose and form a network on the surface of the liver from which fine vessels pass to the perpendicular plate and to the margin of the horizontal plate (*Velella*). These vessels, then, would seem to have received the nutriment which has passed from the central stomach into the liver-canals, for the purpose of redistribution to the soft parts when it has been modified by the biliary secretion. Of the smaller polyps a few, which hang beneath that part of the liver which projects beyond the large polyp, open into liver-canals: but the

greater part of them have no connexion with these canals, or with the central polyp, but lateral branches of the vessels open into their pedicles, so that they at once give the product of digestion to the vascular system. In *Porpita* the lesser polyps open into liver-canals and not into vessels.

The generative organs are seated, as clusters of minute bodies, on the pedicles of the smaller polyps. They become transparent and pyramidal, and having gradually assumed the medusan form are detached. They were first noticed by Delle Chiaje, *Descriz.* iv. p. 107, Tav. 146, fig. 10, 12. The sexual germs are formed on the wall of the radiating vessels. Huxley, Gegenbauer, l. l.

The prehensive organs are placed around the lesser polyps on the horizontal margin of the mantle. They are hollow and open into a vessel like the lesser polyps. They have no special nettle-nodes, but numerous scattered thread-cells.

The air-canals were discovered by Krohn; they are minute vessels which pass from the innermost air-spaces of the horizontal cartilage, perforate the mass of the liver, and reach the walls of the polyps where they appear to terminate by closed extremities. They are most numerous in *Porpita*. See Koelliker *Die Siphonoph.* pp. 46—64.]

Velella Lam. A semi-orbicular crest, compressed, containing a cartilage within, placed obliquely above the disc. Marginal tentacles simple.

Sp. *Velella spirans, Medusa velella* L., *Holoth. spirans* Forsk. *Icon. Rer. natur.* Tab. xxvi. fig. k, *Armenistarium velella* Costa *Ann. des Sc. nat.* sec. série, Tom. xvi. Pl. 13, fig. 3, (figure of the vessels from the stomachs on the inferior surface of the cartilaginous disc), in the Mediterranean. According to Forskål the French sailors call the animal *Vallette:* they eat it fried with flour and butter. The name *Velella* appears to be derived from *velum* and from the crest, which like a full-spread sail, adorns the upper surface. The beautiful blue colour of the animal is imparted to the water in which it is examined, but disappears in spirit of wine. During life the creature is not unattractive ("*non invenusta est quantum vermi licet,*" Forsk. *Descr. Animal.* p. 105); see the coloured figure of Lesueur in Péron, *Voyage aux terres austr.* Pl. xxx. fig. 6. (This species is from the Tropical Seas, *Velella scaphidia* Péron). For the other species, not easily to be distinguished, of this genus, consult chiefly Eschscholtz *Syst. der Acalephen,* s. 168—175.

Subgen. *Rataria* Eschsch. Crest membranous, placed longitudinally on the disc.

Note. If the figures in FORSKÅL, Tab. XXVI. fig. k 3, k 4, k 5, belong to a *young Velella*, as appears from the explanation of the plate, this genus must be suppressed; which is BLAINVILLE'S opinion.

Porpita LAM. The Lamina cartilaginous (?), circular, marked with concentric striæ decussated radially. Marginal tentacles appendiculate.

Sp. *Porpita mediterranea* ESCHSCH., *Porp. Forskalii*, DE HAAN, *Hol. denudata* FORSK. *Icon. Rer. nat.* Tab. XXVI. fig. L., in the Mediterranean;—*Porp. umbella* ESCHSCH., *Porp. gigantea* PÉRON, *Voy. aux terres austr.* Pl. XXXI. fig. 6, in the Tropical Seas; *Porp. chrysocoma* LESS., GUERIN *Iconogr., Zoophytes*, Pl. XVIII. f. 2.—(*Medusa Porpita* L. is merely the cartilaginous disc of some species of this genus.)

Family II. *Physsophoridæ* (*Hydrostatica* CUV.) Body suspended in the water by means of a swim-bladder or of receptacles filled with air.

Bladder-bearers. The opinion that these animals are able to expel the air from the air-bladder at will was rendered doubtful, as a general rule, by OLFERS, who could find no opening in the large bladder of *Physalia*. [Subsequent observations however have determined that *Physalia* is the only one of the *Physsophoridæ* whose bladder does really communicate with the external air. But, though there be no such communication in the rest, LEUCKART states that in many of them (and he believes it to be true of all) the air may be readily caused to pass from the cavity of the bladder into that of the common stem, by the expansion of the upper extremity of which the air-bladder is in all cases surrounded.

a) with short stem or axis without swimming bells.

Physalia LAM. Swimming bladder very large, crested above, with an aperture at one extremity: the whole of the common stem expanded so as to form a receptacle for it: from the inferior surface of the expanded stem the polyps are suspended together with feelers and prehensile organs, of different thickness and of great length.]

Sea-bladder. The colony swims constantly on the surface of the sea, and for that purpose makes use of the crest on the top of the bladder as a sail. Hence its name, *het bezaantje*, *the Portuguese man of war*, *la petite galère*, &c. If in the nomenclature we ought strictly to hold to priority, then this genus ought to be named

Salacia, for thus LINNÆUS announced it in the earlier editions of his *Syst. Nat.*; in the tenth and following editions it is no longer met with, and LINNÆUS afterwards arranged the species known to him under the genus *Holothuria*.

VON OLFERS especially threw much light upon the organisation of this genus by the investigation of *Physalia caravella* ESCHSCH. (*Phys. arethusa* TILES.) A *Physalia* has two bladders, the internal is filled with air, and was described by OLFERS as perfectly closed; the external has an aperture situated at one extremity and surrounded by a sphincter.

[QUATREFAGES has described the action of this sphincter muscle, and the connexion of both bladders with the aperture; he also caused the air contained in the interior bladder to be analysed, and found that it contained less of oxygen than atmospheric air by about 3 per cent.: the animal appeared to be able to expel the air voluntarily at intervals, and to distend the bladder again after a short time: it would therefore seem to be a respiratory organ for the colony: the air-bladder is surrounded on all sides by the external bladder or envelope, which is in fact the expanded stem of the colony: with the under surface of this the various appendages are connected, and into its cavity the cavities of them all open more or less directly: the bladder in *Physalia* did not appear to QUATREFAGES[1] to be merely a passive organ, for besides the power of emptying and distending it the animal seemed to be able to direct the fluid contained in the cavity of the appendages into this or that bundle of them at will, and so to alter the position of the center of gravity of the bladder, and by thus bringing different regions of it to the surface to steer its course.]

The larger and smaller tentacles are capable of extension and contraction, and serve probably for feeling and seizing. Small clumps of red corpuscles, which are situated between the larger tentacles, are, according to OLFERS, eggs: but the sexual organs of the *Physsophoridæ* require further investigation.

See v. OLFERS in *Physikal. Abhandl. der Königl. Akademie der Wissensch. zu Berlin a. d. Jahre* 1831, Berlin 1832, s. 155—200.

Comp. also on this genus J. C. VAN HASSELT *in Algem. Kunst. en Letterbode* 1828, No. 44, 45; F. W. EYSENHARDT, *Nov. Act. Acad. Cæs. Leop.*

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[1] *Ann. des Sc. nat.* 3e Série, Tom. II. p. 115.

Carol. Tom. x. s. 410—416, Tab. xxxv. fig. 42 ; Eschscholtz in o. v. Kotzebue's *Entdeckungs-veise* iii. 1821, s. 193, and *Syst. der Acalephen*, s. 157—164. Leuckart *in Zeitschr. für Wiessensch. Zoologie* iii. 189—213.

Athorybia Eschsch. (*Rhodophysa* Blainv.) [The motor organ of the colony a coronet of solid bracts, or covers, fixed to the stem immediately beneath the air-bladder. Polyps, feelers and prehensile filaments attached to the very short remainder of the stem.

Sp. *Athorybia rosacea* Eschsch. Koelliker *Die Siphonoph.* Tab. vii. The Polyps are not nearly as numerous as the bracts. In large colonies Koelliker could not count more than eight of them whilst the bracts numbered 20—40. They are seated in the space covered by the bracts, and with their points project somewhat beyond them when the coronet opens, but lie entirely concealed when it closes. The feelers are more numerous than the polyps (11—20), long and nearly filiform, and play between the bracts when they open. The lateral subdivisions of the prehensile organs terminate by two filaments.

b) with short axis or stem and swimming bells.

Physsophora Forsk. Several swimming bells disposed verticillately round the common stem. The polyps with feelers and prehensile organs, but without bracts (Gegenbauer), attached to the remainder of the stem immediately below the swimming column.]

Physsophora (from φύσα or φύσσα), literally *bladder-bearer*, was compared by Forskael to the so-called Cartesian Imp (*situs animalis hydrostaticus sublatus pulmone extra corpus, ad formam machinæ quam Diabolum Cartesianum appellamus*). *Descr. Animal.* p. 112.

Sp. *Physsophora hydrostatica* Forsk. *Icon. Rer. nat.*, Tab. xxxiii. fig. E, in the Mediterranean ; *Physsoph. muzonema* Péron, *Voy. aux terres australes*, Pl. 29, fig. 4; Lesson *Acalèphes*, Pl. 9, fig. 2, in the Atlantic, &c.

The species are not sufficiently distinguished ; Forskael figured an imperfect specimen, which for the most part had lost the suctorial tubes and other appendages. The figure given by Philippi not long ago represents the animal in an uninjured state; this writer supposes that the specimen found by him in the Mediterranean belongs to another species, which he names *Physsophora tetrasticha*. There are four rows of swimming bells, and in each row four. See his Memoir in Mueller's *Archiv.* 1843, s. 58—67, Taf. v. [Koelliker states that this of Philippi is identical with the *Physsophora rosacea* of Della Chaija, *Descr. degli anim. invertebr.* iv. pag. 119, Tav. 33, fig. 2.]

[See KOELLIKER's description of a new species (l. l. p. 19, Tab. v.) found by him at Messina, and which he calls *Physs. Philippi.* The type of *Physsophora* is distinguished by the very small length of the axis below the swimming column. The column is as usual terminated by a small bladder above the bells filled with air. Beneath it the polyps, feelers, prehensile and sexual organs are all compressed into a small space. The feelers surround the axis immediately beneath the bells in a continuous coronet, like the calyx of a flower. They are described by KOELLIKER as exceedingly sensitive, in constant motion, and even laying hold of prey. Within the circlet of feelers arise the Polyps, each with its prehensile filament. The nettle-node has an exceptional formation. There are no bracts or covers, their protective office being supplied by the near neighbourhood of the swimming column. The sexual organs are seated in bunches on the stem close to the Polyps, a pair of different sex at the base of every Polyp.

c) with long axis without swimming bells.

Rhizophysa PÉRON. No swimming bells: the polyps with their prehensile organs lateral, usually secund: bracts and feelers wanting.

Sp. *Rhizophysa Peronii* ESCHSCH. *Acal.* Taf. XIII. fig. 3. *Rhizophysa filiformis* LAM., *Zeitschrift für wissensch. Zoologie,* v. s. 324—330. Taf. XVIII. fig. 5—11.

d) with long axis or stem and swimming bells at the upper part of the common stem.

Stephanomia PÉRON, ESCHSCH. Swimming bells numerous, forming a conical column which surrounds the stem with many spiral turns. Polyps set on the stem by a long, slender, contractile pedicle. Feelers pediculate affixed to the stem, usually in threes between two successive Polyps. Bracts or covers not confined to the stem, but also surrounding the base of the Polyps as the calyx a flower. Prehensile filaments very long with lateral branches at regular intervals bearing a node and terminating in a single thread. Sexual organs in bunches close set on the feelers from the stem.

The *Stephanomia uvaria* of LESUEUR does not, according to KOELLIKER, differ from *Apolemia* ESCHSCH.

In a specimen of *Stephanomia* four feet in length LEUCKART counted no less than 20 spiral turns in the swimming column, with 10—12 bells in each turn. The three feelers from the stem are two on a common pedicle and one sessile. The male and female organs

are in close proximity to each other at the base of the double feelers. The male are the least numerous, the form oval, slightly medusan, the nucleus as it ripens passing from red to yellow: there are four radial canals and a circular canal, the mantle lying close to the nucleus and having an opening. The female appendages are smaller and round, but of similar structure, except that the central vessel of the nucleus is not developed, for each appendage contains only a single egg. Compare the interesting observations and figures of MILNE EDWARDS *Ann. des Sc. Nat.* 2e Série Tom. XVI. *Zool.* pp. 217—229, Pl. 7—10. Also *R. Anim.* CUV. *éd. illustr. Zooph.* Pl. 59. See LEUCKART *Zoolog. Untersuch. Erster Heft.* s. 38.

Forskalia KOELLIKER.

Sp. *Forskalia Edwardsii* KOELL. This new genus and species differs little, if at all, from *Stephanomia* according to LEUCKART. See the description and beautiful figures in KOELLIKER *Die Siphonophoren v. Messina*, s. 2—10. Taf. I. II.

Agalmopsis SARS. Swimming column formed of two rows of bells alternating. Below it, the stem gives origin to single Polyps, feelers, prehensile filaments and sexual organs with numerous transparent bracts or covers.

Sp. *Agalmopsis elegans* SARS, *Fauna littor. Norvegiæ* I. p. 36, Tab. V. fig. 7, 8. The prehensile filaments give off branches which again subdivide to terminate in two threads: a contractile bladder is seated below the point of last division, and immediately before this is a spiral nettle-node covered by a bell-shaped duplicature from the filament on which it is placed. *Agalmopsis punctata* KOELL., a new species, differs from the last in the branches of the prehensile organs having the node without a cover, and in terminating without further division: also the feelers have special prehensile organs which are knotted.

Agalma ESCHSCH. Swimming column with bells in two rows: feelers scattered. Polyps with bracts and prehensile organs of which the lateral branches are provided with a large nettle-node and subdivide to terminate in two threads having a contractile vesicle between them at the division.]

Sp. *Agalma Okeni* ESCHSCH. *Isis* XVI. 1825, Tab. 5, *Syst. der Acaleph.* p. 151, Tab. XIII. fig. 1.

[*Apolemia* ESCHSCH. Swimming column composed of two rows of bells of quadrangular form with rounded angles. Feelers from two to four set on the stem between successive pairs of bells.

Polyps numerous, sessile, prehensile organs with simply spiral nettle-nodes. Bracts claviform with special prehensile organs small, knotted. At regular distances below the swimming column a collection of polyps with all these appendages surround the stem.

Note.—In no other genus of *Physsophoridæ* are feelers met with on the part of the stem which supports the swimming bells.

Stephanomia uvaria LESSON belongs to this genus: KOELLIKER, *Die Schwimmpolypen*, s. 18. See GEGENBAUER'S description of a complete specimen of it, and figure, *Zeitschrift für wissensch. Zool.* v. s. 319—324. Pl. XVIII. fig. 1.

Family III. *Hippopodidæ*. Colonies of swimming Polyps, without swimming bladder, with short common stem, the swimming column not formed of bells.

Hippopodius QUOY and GAIM. ESCHSCH. The swimming column formed of bracts in two rows, and covering one another imbricately, with filiform short stem, to which the polyps with their prehensive and sexual organs are attached.

Sp. *Hippop. luteus, Ann. des Sc. nat.* X. 1827, s. 172, 173, Pl. IV. A. GUERIN *Iconogr., Zooph.* Pl. XIX. fig. 4.—*Hippopod. neapolitanus* KOELL. *Die Siphon.* pp. 28—31. Tab. VI. figs. 1—5.

Vogtia KOELL.

Sp. *Vogtia pentacantha* KOELL. *Die Siph. von Messina*, s. 31, 32. Tab. VIII.

Family IV. *Diphyidæ*. Locomotive apparatus of the colony two distinct cartilagineo-gelatinous transparent pieces affixed to the upper part of a thin cylindrical common stem. The stem beginning in the substance of the anterior piece passes in a groove of the posterior between the two, and then gives attachment to groups consisting of a single polyp and its appendages.]

This family includes certain marine animals, transparent as glass, which swim by means of the contraction of hollow organs filled with water; it has the genus *Diphyes* for its type, which was first formed by CUVIER in the first edition of his *Règne Animal*, IV. p. 61. This genus rested on a species discovered by BORY DE SAINT-VINCENT at the beginning of this century (1801), in the South Atlantic Ocean, and described under the name of *Salpa bipartita;* see his *Voyage dans les quatre principales îles des Mers d'Afrique*,

I. 1804, p. 134, Pl. VI. fig. 3, A, B, C. The two pieces provided with swimming cavities, nearly similar in form, were afterwards, by CUVIER (*Règne Anim. sec. éd.* III. p. 288) and other writers, erroneously taken to be two animals which had become attached to each other, an opinion occasioned by observing that they were readily separated. This separation, or spontaneous detachment of different parts, has often been remarked in the entire order—as in *Physsophora, Rhizophysa, Stephanomia.* In fact, *Diphyes* is much more nearly allied to these genera than might be suspected from many, and sometimes very confused, descriptions of it. I may remark, that the part which, in our description, we have indicated as anterior, is called posterior by the first discoverer, BORY, and by many others after him.

QUOY and GAIMARD, who discovered many new species of this family and formed new *genera* from them, (*Ann. des Sc. nat.* Tom. x. 1827, p. 5—21,) determined subsequently to bring them all under the single genus *Diphyes,* (*Voyage de découvertes de l'Astrolabe, Zoolog.* Tom. IV. 1833, p. 81). [But more accurate observations of late years have shewn that this proceeding is not advisable. In *Praya* the swimming bells are similar in form, and are placed, more or less, side by side, and their cavities open on opposite sides of the stem. In *Diphyes* the bells are placed behind one another and open backwards.

The common stem begins within the substance of the anterior bell, or piece, in a more expanded portion, which is lined with large epithelial cells, and has very different form in different genera. This expanded portion often contains a globule of oily matter. Beneath it the stem gives origin to the canals of the swimming pieces, and then is prolonged to become the common axis of the colony.

The polyps with their different appendages are fixed to the stem at regular intervals. Those nearest to the swimming pieces are quite undeveloped and without appendages. Those at the other extremity of the stem are the oldest and most perfect, and have their appendages most complete. Each group consists of a Polyp, a set of prehensile organs, and the generative organ, which partakes more or less of the medusan form—the whole being covered by a protecting bract. Such a group either persists in adhering to the common stem, (*Diphyes, Praya*), and then only certain parts are detached, as the medusiform capsules of the sexual organs; or it is

capable, to a certain degree, of independent existence, and when fully developed, separates itself from the stem of the colony (*Abyla*). In the *Prayidæ*, the covers are bounded by round surfaces above, and have a cavity below, like a helmet, to receive the other members of the group: in *Diphyes* they surround the stem like a rolled leaf, (differing, however, in form in the different species) and adhere to it by the narrow part. In *Abyla* they cover the members of the group imperfectly, are almost solid, yet with a cavity in the interior which is in connexion with that of the stem, and which is lined by large cells. In all these groups the sexual buds are more or less medusiform, and may be developed into a swimming bell. They sprout from the base of the Polyp.]

Comp. on this family, besides the above work of QUOY and GAIMARD, especially ESCHSCHOLTZ, *Syst. der Akalephen*, s. 122, 123, LEUCKART *Zoologische Untersuchungen*, I. s. 41—49, KOELLIKER *Die Schwimmpolyp.* s. 36—46: also WILL, *Horæ Tergestinæ*, s. 76—83, GEGENBAUER in *Zeitschr. f. wiss. zool.* V. s. 297—300.

[*Diphyes* CUV. The posterior swimming piece received into a cavity of the anterior: the groups on the common stem protected by a bract or cover in form of a rolled leaf.

Sp. *Diphyes angustata* ESCHSCH. Tab. XII. fig. 6 (the species of BORY seems to belong here;)—*Diph. campanulifera* ESCHSCH., QUOY and GAIMARD *Ann. des Sc. nat.* X. 1827, Pl. I.; *Diph. gracilis* GEGENBAUER *Zeitschr. für wissensch. Zoologie*, V. s. 309—315. Taf. XVI. fig. 5—7.—*Diph. Sieboldei* KOELL. *Die Siphon. v. Messina*, s. 36—41. Taf. XI. fig. 1—8.—*Diph. gracilis* GEGENB. *Zeitschr. f. w. Zool.* V. s. 313—315. Taf. XVI. fig. 5—7.—*Diph. Kochii* WILL *Hor. Tergest.* Tab. II. f. 22—26; figured without the posterior portion which WILL did not meet with in any one of the six specimens examined by him[1].

Abyla ESCHSCH. QUOY and GAIMARD (*Calpe* of the same). The two swimming bells of very different size, the anterior much the smaller. The bracts cover the members of the groups imperfectly, are massive, and have a cavity communicating with the stem.

Sp. *Abyla pentagona* ESCHSCH., KOELLIKER *Die Siph. v. Mess.* s. 41—46, Tab. X.; here the single polyps have no covers: see a complete specimen described and figured in LEUCKART *Zool. Untersuch.*, I. s. 56—61, Taf. III. fig. 1—10. The bracts, or covers, which are not visible on the polyps at

[1] Compare also on this genus LESSON *Centurie Zoologique*, 1830, p. 161—183, Pl. 55—57.

the upper part of the stem, undergo remarkable metamorphoses after their first appearance as buds until they attain the cubical form, when the group of which it forms a part exactly resembles a young *Eudoxia cuboides*, Quoy and Gaim. See also Gegenbauer *Zeitsch. fur wiss. Zool.* v. s. 292—295.

Praya Lesson. The two swimming pieces of the colony nearly similar and equal, the covers of the developed groups bounded by round surfaces above and concave beneath.

Sp. *Praya diphyes* Less., Koelliker *Die Siphon. von Mess.* s. 33—36, Taf. ix.—*Praya maxima* Gegenb. *Zeitsch. f. wissensch. Zool.* v. s. 301—309, Taf. xvii. fig. 1—6.

The genera *Eudoxia, Ersœa, Aglaisma* Eschsch., which have only a single polyp, have been termed monogastric *diphyidæ* by Huxley; but it is almost certain that they are not independent genera. It has been noted above, when treating of *Abyla pentagona*, that a single group of this compound *diphyes* exactly resembles *Eudoxia cuboides;* and here the groups have been seen to detach themselves from the colony both by Leuckart and by Gegenbauer—as indeed the same fact had previously been observed by Sars in his *Diphyes truncata. Eudoxia campanulata* is believed by Leuckart to be a group of *Diph. acuminata*, a new species observed by him at Nice; whilst he has found that *Aglaisma pentagonum* is not a monogastric *diphyes*, but an imperfectly developed *Abyla pentagona*, see *Zoologisch. Untersuch.* s. 54. *Ersœa* is suspected by Leuckart to be a detached group of *Diphyes Koch.* Will.

Eudoxia (&c.) consists of a cover or bract, a polyp with its prehensile organs, a swimming bell (sexual capsule), and usually a smaller bell sprouting from the base of the polyp, which is destined to replace the larger when this has been detached. These parts are all connected by their canals to a portion of common stem.]

Sp. *Ersœa pyramidalis* Will, i. l. fig. 27, &c.;—Comp. Leuckart *Zool. Untersuch.* i. s. 43—61, Gegenbauer *Zeitsch. f. wiss. Zool.* v. 285—296.

Order II. *Ctenophorœ*, or *Beroëcea.*

Mouth simple, stomach situated in the axis of the body. Vibratile cilia disposed in rows on the surface of the body. Swimming bladders none.

The Beroëcious animals are Acalephs of very different form, which, however, are distinguished from the former order by the absence of swimming bladders [bells] and cartilaginous laminæ, as

well as suctorial mouths: [they are single animals, in short, and not colonies.] The projecting edges, usually named ribs (*costæ*) which are beset with cilia, especially characterise this family: whence the German name *Rippenquallen*. Whether these vibratile cilia, which occasionally are so arranged as to form vibrating laminæ, do really cause the progression of these animals, as is usually assumed, is in consequence of the objections raised by MERTENS and by WILL (*Horæ Tergest.* s. 8—13) exceedingly doubtful.

The name *Beroë* given by BROWN (*Nat. Hist. of Jamaica*) to the animal discovered by him in the middle of the last century, is borrowed from Mythology; it is that of one of the numerous daughters of *Oceanus:*

> *Clioque et Beroë soror, Oceanitides ambo.—*
> VIRGIL, *Georgic.* Lib. IV. 341.

Comp. on this order: RANG, *Établissement de la Famille des Béroïdes et description de deux genres nouveaux qui lui appartiennent; Mémoires de la Soc. d'Hist. nat. de Paris,* Tom. IV. 1828, pp. 166—173, Pl. 19, 20. MERTENS *Beobachtungen und Untersuchungen über die beroeartigen Acalephen, Mém. de l'Acad. imp. des sc. de St. Petersbourg, sc. physiq.* sixième série, Tom. II. 1838, pp. 479—543, Taf. I.—XIII. (A copious extract may be found in OKEN'S *Isis,* 1836, s. 311—321.) LESSON, *Mém. sur la famille des Béroïdes, Ann. des Sc. nat.* 2e série, Tom. VI. *Zool.* 1836, pp. 235—266.

Family V. *Beroidea.* (The characters of the order are those of the single family.)

A) Stomach small.

Cestum LESUEUR. Body transverse, elongate, gelatinous, with ciliated margins.

Sp. *Cestum Veneris* LESUEUR *Nouv. Bullet. de la soc. philom.* Juin, 1813, Pl. V. (Recus. in OKEN'S *Isis,* 1817, s. 1505—1508, Tab. XII.) GUÉRIN, *Iconogr. Zooph.* Pl. 18, fig. 1. (after a drawing by LAURILLARD) in the Mediterranean. This *girdle of Venus* has the form of a band of more than five feet long, and full two inches high. In the thinner inferior edge is situated the oral aperture (opposite to the place assigned to it by LESUEUR in the thicker superior edge). In *Cestum Najadis* ESCHSCH. *Acal.* Tab. I. fig. 1, from the South-Sea, near the Line, two long *tentacula* beset with fine threads are present, which in the species from the Mediterranean are often, and in *Cestum Amphitrites* MERTENS (l. l. Tab. I.) are (always?) wanting.

The genus *Lemniscus* QUOY and GAIM. is probably founded on a detached piece of *Cestum.*

Callianira PÉRON. Body lobate or supplied with lateral wings.

Subgenera: *Eucharis* ESCHSCH., *Leucothea* MERTENS, *Mnemia* ESCH. (*Alcinoë* RANG), *Lesueuria* MILNE EDW., *Calymma* ESCHSCH. (*Ocyroë* RANG), *Callianira* PÉRON, ESCHSCH.

In bringing these numerous genera together, and giving greater extension to the name *Callianira*, than has been done by former writers, my sole object is to facilitate the review, and at the same time to indicate the affinity of these animals. Beyond doubt the genera are too numerous here. The genus *Bucephalon* of LESSON (*Callianira bucephalon* REYNAUD, LESS. *Centur. zool.* Pl. 28) also belongs here, and probably does not differ from *Calymma Trevirani.*

Sp. *Callianira hexagona* ESCHSCH., *Callian. Slabberi* DE HAAN, *Natuurkundige Bijdragen* II. 1827, pp. 150—152; this species has been confounded with *Beroë hexagonus* of BRUGUIÈRES (found at Madagascar). In the genus *Callianira* proper, there are two filiform branched tentacles; the other subgenera have mostly four conical or triangular ciliated tentacles.

Cydippe ESCHSCH. (*Beroë* FREMINVILLE, MERTENS.) Body globose or ovate, with eight longitudinal, ciliated ribs. Tentacles two, retractile within two subcutaneous vesicles.

Sp. *Cydippe pileus, Beroë pileus* MUELL., *Volvox bicaudatus* L.; L. TH. GRONOVIUS in *Uitgezochte Verhandelingen* Amsterd. 1758, III. p. 464, Pl. 26, f. 1—5; BASTER *Natuurk. Uitsp.* I. Pl. XIV. fig. VI. VII.; CUV. *R. Ani. éd. ill., Zooph.* Pl. 56, fig. 2, &c. (Since the vesicles, in which the tentacles lie, open towards that extremity of the body which is opposite to the mouth, the nervous ring (?) described by GRANT, cannot surround the mouth, (see above, p. 104). The tentacles are able to lengthen themselves greatly; why ESCHSCHOLTZ describes them as *indivisa*, is not apparent; at least in most species they are much divided.

B) Stomach large. A circle of vessels (aqueducts) round the oral aperture.

Beroë ESCHSCH. (spec. of the genus *Beroë* GRONOV., MUELL. and others) *Idya* FREMINV., OKEN, MERTENS. Body oval, ribbed, with large circular aperture beneath.

Sp. *Beroë ovata* BROWN, *nat. Hist. of Jamaica*, Pl. XIV. fig. 2; (this animal was the first named Beroë; LINNÆUS named it in the tenth edit. of the *Syst. Nat., Medusa Beroë*, in the twelfth (1767) *Volvox Beroë*);—*Beroë Forskälii, Medusa Beroë Forsk.*, MILNE EDW. *Ann. des sc. nat.* 2e série, Tom. XVI. *Zool.* Pl. 5, 6; CUV. *Règne Anim. éd. illustr., Zooph.* Pl. 56, fig. 1, &c.

Order III. *Discophoræ.*

Body disciform or campanulate, above naked, below usually provided with arms or tentacles.

The *Medusoïds* or *Sea-blubber.* They have a gelatinous disc, on the upper surface more or less spherical, which from its form has been compared to an umbrella or a hood; the form has some resemblance to toad-stools (*agarici*). These animals move themselves by expansion and contraction of the hood. The mouth, or the suctorial organs which take the place of the mouth, are situated in the center of the inferior surface, sometimes elongated into a pedicle and provided with different tentacles. On this difference are founded the numerous genera which modern writers have felt justified in adopting.

Compare on this order: Péron et Lesueur, *Tableau des caractères génériques et spécifiques de toutes les espèces de Méduses connues jusqu'à ce jour. Annal. du Muséum* xiv. 1809, pp. 325—366.

J. F. Brandt, *Ausführliche Beschreibung der von* C. H. Mertens *auf seiner Weltumsegelung beobachteten Schirmquallen; mit* 34 *meist colorirten Tafeln.* St Petersburg, 1838, 4to (from the *Mém. de l'Acad. des Sc. de St. Petersburg,* vi^e^. Série, Tom. iv.)

A) Many oscules.

Family VI. *Geryonidæ.* A peduncle from the center of the inferior surface of the disciform body, with the free extremity lobate, or furnished with arms. The border of the body mostly tentaculate. (*Genus Dianœa* Lam.)

It is not so completely established that all the forms here brought together are really characterised by the absence of a simple mouth. Will at least, in the animals placed by him in the genus *Geryonia,* found a mouth surrounded by four lobes. In some the pedicle is supplied at its extremity with a folded appendage (*Geryonia*), in others at its base, or at its extremity, it is beset with threads: *Favonia, Lymnorea,* &c.

Genera: *Geryonia* Péron, *Proboscidactyla* Brandt, *Dianœa, Linuche* Eschsch., *Saphenia* Eschsch., *Eirene* Eschsch., *Limnorœa* Péron, *Favonia* Péron.

Sp. *Geryonia proboscidalis, Medusa proboscidalis* Forsk. *Icon. rer. nat.* Tab. 36, fig. 1; Guérin *Iconogr., Zooph.* Pl. 16, fig. 2; Cuvier, *R. Anim., édit. illustr., Zooph.*, Pl. 52, fig. 3. This species from the Mediterranean, with six threads or tentacles at the margin of the disc, may be considered as the *type* of this division.

Family VII. *Rhizostomidæ.* Arms ramose, with many suctorial oscules. Margin of the body without tentacles. Disc with four *ovaria* or *testes*, sometimes (in *Cassiopea*) eight.

Rhizostoma Cuv. Tentacles amongst the arms none; arms confluent into one pedicle inserted in the disc.

Sp. *Rhizostoma Cuvierii,* Réaumur *Mém. de l'Acad. des sc. de Paris,* 1710, Pl. xi. fig. 27, 28; Cuvier *Journ. de Physique* Tom. xlix. p. 436; Cuv. *R. Anim. édit. ill. Zooph.* Pl. 49. This species sometimes attains to a great size. The *Rhizostoma* has four pairs of suctorial arms, which are provided with absorbent vessels; by these it receives its nutriment, which consequently consists of minute animalcules, or of animal matters in solution. These absorbent vessels and their branches coalesce into four stems, which run along the pedicle and end in the stomach. From the stomach run laterally vessels through the hood. Surrounding the stomach are four cavities, with very wide opening below, in which the organs of propagation are seated. The uppermost portion of the hood consists of a substance more firm than the rest of the body. See K. W. Eysenhardt, *Zür Anatomie und Naturgeschichte der Quallen, Nov. Act. Acad. Cæs. Leop. Carol. Nat. Curios.* T. x. pp. 375, &c. with figures. *Rhizostoma Aldrovandi* Péron, Guérin *Iconogr., Zooph.* Pl. 15, fig. 1, &c.

Cassiopea Péron. Tentacles amongst the arms none. Arms eight or ten, very much branched, not conjoined at the base into a peduncle, furnished with vesicular appendages.

Sp. *Cassiopea frondosa, Medusa frondosa* Pall., *Spic. Zool.* x. Tab. ii. fig. 1—3; *Cassiopea borbonica* Delle Chiaje, *Mémorie sulla storia e notomia degli Animali senza vertebre del Regno di Napoli,* i. 1823. Tab. iii.; Guérin *Icon. Zooph.*, Pl. 15, fig. 2; Cuv. *R. Anim. édit. illustr., Zooph.* Pl. 51, fig. 2, &c. (See other figures of Tilesius *Nov. Act. Acad. Cæs. Leop. Car. Natur. Curios.* Tom. xv. 2. 1831, pp. 247—288, Tab. 69—73.

Cephea Péron. Large cirri amongst the arms.

Sp. *Cephea cyclophora* Péron. *Medusa cephea* Forsk. *Icon. rer. nat.* Tab. xxix. fig. (copied in Cuv. *R. Anim. édit. illustr., Zooph.* Pl. 51, fig. 4) &c.

B) Mouth single central.

Family VIII. *Medusidea.* Mouth tetragonal central. Arms four, mostly very distinct, very rarely none. Four lateral cavities in the disc, open beneath, inclosing the genital organs.

This family nearly coincides with the genus *Cyanœa* Cuv. The four openings beneath the disc, conducting to the cavities which contain the organs for propagation, were by Péron and Lamarck incorrectly considered to be four mouths.

Cyanœa Cuv. (and species of the genus *Pelagia* ejusd.)

Genera: *Sthenonia* Eschsch., *Phacellophora* Br., *Cyanœa* Eschsch., *Aurelia* Péron; *Pelagia* Péron, *Chrysaora* Péron, *Ephyra* Eschsch. (*Euryale* and *Ephyra* Péron.)

Sp. *Cyanœa aurita, Medusa aurita* L.; Mueller *Zoolog. danic.* Tab. 76, 77; Ehrenb. *Abhandl. der Akad. zu Berlin, physik. Klasse* 1835; Cuv. *R. Anim. édit. ill., Zooph.* The four arms are considerably longer in old than in younger specimens; these arms consist of two laminæ crumpled at the edges, which during life face each other in such a way as to form a canal; after death they are flaccid and parted asunder. The disc is not quite circular, but in some degree divided by indentations of the margin into eight lobes. The four arms unite at the center of the body to form a circular aperture: this mouth leads to the stomach, which has four lateral cavities. From the stomach there run sixteen vessels to the margin of the disc, of which eight, divided into branches, alternate with eight others undivided and open at the margin. In addition, there are eight corpuscles at the margin, which Ehrenberg considers to be eyes, and which were noticed above. This species is found in the North Sea and the Baltic. Comp. H. M. Gaede *Beiträge zur Anatomie und Physiologie der Medusen, mit 2 Kupfertafeln*, Berlin, 1816, 8vo; Baer *Ueber Medusa aurita*, Meckel's *Archiv für die Physiol.* viii. 1823, s. 369—391, with fig.; F. Rosenthal *Beitrag zur Anatomie der Quallen, Zeitschrift für Physiol., herausgegeben von* F. Tiedemann, G. R. *und* L. C. Treviranus, i. 2, 1825, s. 318—330, with fig.

Cyanœa capillata, Medusa capillata, Baster *Natuurk. Uitsp.* ii., Tab. v. fig. 1.

Pelagia noctiluca Eschsch., *Medusa noctiluca* Forsk., Wagner *Bau der Pelag. noctiluca* and *Icon. Zool.* Tab. xxxiii.; in the Mediterranean, &c.

Ephyra Eschsch., probably rests on young forms of *Cyanœa;* comp. Will *Hor. Tergest.* Tab. ii. fig. 20, and Sars in Erichson's *Archiv*, 1841, Tab. ii.

Family IX. *Oceanidæ.* Disc without lateral cavities to inclose generative organs. Body campanulate. Mouth and œsophagus often elongated into a proboscis. Arms conspicuous or lobes around the mouth. Canals proceeding from the stomach elongate.

Oceania PÉRON (with the addition of several species, and other genera).

Subgenera: *Oceania* PÉRON, *Circe* MERTENS, *Conis* BRANDT, *Callirhoë* PÉRON, *Thaumantias* ESCHSCH., *Tima* ESCHSCH., *Melicertum* OKEN, *Cytæis* ESCHSCH., *Phorcynia* PÉRON.

Sp. *Oceania marsupialis* ESCHSCH., *Medusa marsupialis* L.; PLANC. *de Conch. min. not.* Tab. IV. fig. 5; MILNE EDWARDS, *Ann. des Sc. nat.* XXVIII. 1833, pp. 248—266, Pl. 11—13, Mediterranean; — *Callirhoë Basteriana* PÉRON, BASTER *Natuurk. Uitsp.* II. Tab. V. fig. 2, 3, &c.

Family X. *Æquoridæ*. Disc without lateral cavities, inclosing organs of generation. Body depresso-campanulate or plane. Mouth and œsophagus not elongated into a proboscis. Arms none or little evolved. Stomach with sacculated appendages or canals radiating, elongate, numerous.

Æquorea PÉRON, CUV.

Subgenera: *Æquorea* PÉRON, *Stomobrachium* BRANDT, *Mesonema* ESCHSCH., *Eurybia* ESCHSCH., *Polyxena* ESCHSCH.

Sp. *Æquorea Forskalina* ESCHSCH., *Medusa æquorea* FORSK. *Icon. rer. nat.* Tab. XXXII.; — *Æquorea violacea* MILNE EDWARDS *Ann. des Sc. nat.* 2e série, Tom. XVI. *Zool.* pp. 193—199; CUV. *R. Ani. éd. ill., Zooph.* Pl. 72; the margin has many conical cirri, the mouth is wide and round; from the stomach proceed about eighty long undivided rays (water-canals), which run towards the margin, and appear to open on a small conical point between two cirri. The genital organs are situated below on the disc, on each side of every ray as folded borders, but they do not extend as far as the margin. (ESCHSCHOLTZ divided the *Discophoræ* into *Cryptocarpæ* and *Phanerocarpæ, Syst. der Acal.* p. 41; to the last, which have the sexual organs placed crucially in the disc and attracting observation by their colour, belong the *Rhizostomidæ* and *Medusidæ;* to the first the *Geryonidæ, Oceanidæ* and *Æquoridæ;* in all of these the sexual organs have not yet been detected, but they will probably be found at the under side of the disc, and since in *Æquorea violacea,* according to the observations of MILNE EDWARDS, they strike the eye on this surface, and are also distinguished by their violet colour, we cannot accept the name *Cryptocarpæ.*

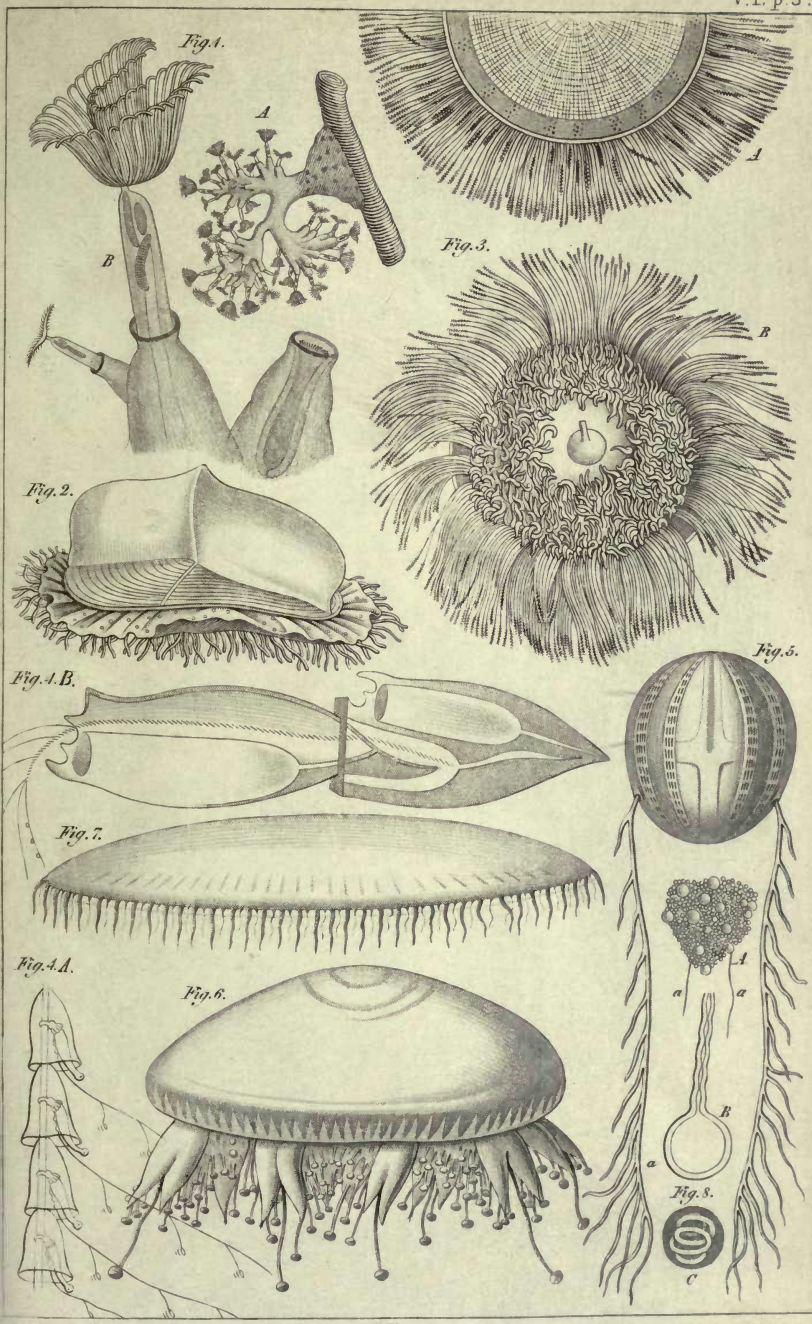
[The Cryptocarpæ of ESCHSCHOLTZ include the *naked-eyed Medusæ* of FORBES.]

Note to the *Discophoræ.* There remain certain genera of authors, in which a mouth has not been found, namely *Eudora* and *Berenice* PÉRON. (Sp. *Berenice rosea, Cuvieria* PÉRON *Voyage aux terr. austr.* Pl. 30, f. 2; GUÉRIN *Iconogr. Zooph.* Pl. 16, fig. 1.) These

genera, to which may be added *Staurophora* BRANDT, form a family in the system of ESCHSCHOLTZ, to which he has given the name *Berenicidæ*. This family appears to me to be doubtful, as it does to BRANDT and others; we must leave the decision to time, I prefer to wait the result of new observations, rather than to attribute to Acalephs nutrition by superficial absorption.

For the rest, several genera of Acalephs are founded on figures of authors alone—and these sometimes imperfect and faulty. Hence no part of Zoology is more uncertain than this.

Accordingly there are many genera which I have not recorded, and possibly more might have been omitted. For here excess of timidity is better than dearth of prudence.



H. Bruch sc.

Plate II. Polyps.

Fig. 1. *Anthelia glauca*, p. 77.

Fig. 2. *Xenia umbellata*, p. 77, both after Savigny *Descript. de l'Egypte, Polypes*, Pl. I.

Fig. 3. *Corallium rubrum*, p. 83, magnified, after Milne Edwards, Cuvier *R. Ani., Zoophytes*, Pl. 80, fig. 1. *a*, *a*, *a*, three polyps, of which the two lowest are retracted within the bark; *b*, *b*, bark; *c*, stony axis.

Fig. 4. *Mopsea, Isis elongata*, Esper, p. 83, after a specimen in the National Museum of Nat. Hist. at Leyden.

Fig. 5. *Caryophyllia ramea* Lam., p. 86, after Milne Edwards, Cuvier *R. Ani., Zooph.*, Pl. 83, fig. 1.

Fig. 6. *Actinia coriacea* Cuv., p. 91, after Rapp *Polypen und Actinien*, Taf. I. 3, 4. A, in the contracted state; B, expanded.

Fig. 7. *Halodactylus diaphanus* Farre, p. 96. A, the gelatinous polypary of nat. size, after Van Beneden *Bryozoaires;* B, a polyp magnified 80 times, after Farre *Phil. Trans.* 1837, Pl. 26, fig. 7.

Plate III. Polyps, fig. 1; Sea Nettles, figs. 2—8.

Fig. 1. *Plumatella cristata* Lam., p. 96, after Trembley *Polyp.* Pl. X. figs. 8, 9. Fig. A, natur. size; fig. B, three polyps magnified, of which one is retracted within its cell, and another still young and undeveloped.

Fig. 2. *Vellella scaphidia* Péron, p. 110, after Péron *Voyage aux terres Austr.* Pl. XXX. fig. 6.

Fig. 3. *Porpita umbella* Eschsch., p. 111, after Péron, Pl. XXXI. figs. 6 and 6 *a*; A, from the dorsal surface, B, from below.

Fig. 4. *Diphyes campanulifera* Eschsch., p. 118, after Quoy and Gaimard *Ann. des Sc. nat.* X. 1827, Pl. I. figs. 1, 3. A, the animal consisting of two pieces, nat. size B.

Fig. 5. *Cydippe pileus* Eschsch., p. 121, after Milne Edwards in Cuvier *R. Ani., Zooph.*, Pl. 56, fig. 2.

Fig. 6. *Cassiopea borbonica* Delle Chiaje, p. 123, after the figure of Delle Chiaje reduced in Guérin's *Iconographie.*

Fig. 7. *Æquorea violacea* Milne Edwards, p. 125, after the figure in the *Ann. des. Sc. nat.*, 2e Série, Tom. XVI. Pl. I. fig. 1.

Fig. 8. Nettle-organs (pp. 99, 100), from *Pelagia noctiluca* (p. 124), after Wagner *Icon. Zootom.* Tab. XXXIII. figs. X. XI. A, when slightly magnified the round vesicles amongst the pigment-