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OPISTHOBRANCHS FROM AUSTRALIA.

By

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(Plate lvi.)

In the following paper Opisthobranchs are described from Australia generally. Notes had been made on these either at the time of collecting, or when they were brought alive to the Museum, so that observations on them and records of their correct colours would be available for future reference. In this way, many useful notes on other new or uncommon species have accumulated, and are ready to be converted into more complete descriptions when the preserved animals are thoroughly examined.

If little work has been done on the Australian Nudibranchs, still less has been done on the Opisthobranchs generally, though the coast of Australia should be rich in this order, particularly in the northern regions. I therefore think it will serve a better purpose to publish what material I have ready for publication in small papers than to accumulate it for a larger paper.

My thanks are due to those who are mentioned in the text for their kindness in collecting and carefully preserving specimens for me.

Suborder TECTIBRANCHIATA.

Family AGLAIIDÆ.

Genus **Aglaia** Renier, 1804.

Aglaia Renier, Prospette delle Classe dei Verme, p. 16 (1804); Tav. di Classificazione, 1807, Pl. 8. *Fide* Pilsbry, Man. of Conch. [Tryon], Vol. xvi, 1895-6, p. 44. Type of genus here designated *Aglaia tricolorata* Renier.

Animal smooth with a soft body separated into two dorsal shields by a transverse furrow. The posterior one produced to form two lobes. The foot is wide and truncated, and the sides either stand erect or extend over the sides of the body as fleshy folds. No rhinophores or frontal head appendage. A flat shell with a slightly spiral whorl and minute spire is at the posterior end. Gill plume large, placed posteriorly on the right side. Buccal mass conspicuous, no jaws or radula.

The generic name *Aglaia* was first definitely given by Renier in 1807 to two species from the Mediterranean, but as Pilsbry (Man. of Conch. [Tryon], Vol. xvi, 1895-6, p. 44) points out, without any justification the name adopted by authors generally was *Doridium* of Meckel, 1809. He considers *Philinopsis* of Pease, for a Sandwich Islands' species, a synonym of *Aglaia*.

Though the latter name was given to a Mediterranean species, I cannot find any characters in the species described below to warrant making a new genus for them. As I had only a single specimen for each species, I think it advisable to leave them in the genus *Aglaia* until I have more specimens. My species may be nearer those of Pease's genus, of which there is only a brief description, and which Pilsbry considers a likely synonym of *Aglaia*.

Aglaia taronga, sp. nov.

(Plate lvi, figs. 1–3.)

Animal large, very soft and smooth, broad at the anterior end. Posterior disk is shorter than the anterior one, evenly lobed on either side. The anterior dorsal disk is produced to a rounded point posteriorly, which the animal erects when in motion. The foot extends the whole length of the body, reaching to the margin of the dorsal surface for some distance, then expanding into lobes, until it reaches its greatest width near the gills; the lobes curl up over the sides of the animal. Mouth large and rounded, orals hidden. Shell situated at hinder portion just above the gills. It is straw coloured towards the centre, whitish towards the margins, convex externally, concave internally, with a slight volution and a broad membranous expansion.

The colour of the animal in life is rich velvety dark brown, with sometimes a bluish bloom over it. The sides of the lobes are outlined with a thin hairline of white with a dark inner brown band. The tail lobes are also outlined with white. A thin interrupted central line of white, becoming spotted in places, runs down the centre of the body towards the posterior point of the anterior disk, and then down to the hinder disk. A line of white, then a line of brown, are on the sides of the anterior disk. Down each side is a rich orange yellow stripe, wide at the top, thinning out as it approaches the end and becoming paler. The posterior point of the anterior disk is very dark in colour, with a small orange spot on the apex and orange dots extending from it up the sides. A streak of orange dots is on the head on each side of the central whitish line, and an irregular row of orange spots and dashes round the body lobes, just below the dark band. A broad band of orange is on each side of the tail lobes, below the dark colour. Over the whole surface of the body are scattered patches of small creamy-white splashes. Single dots are arranged round the yellow marks on the head. The sides of the lobes have larger creamy-yellow markings covering them.

Inside the lobes are transparent whitish-grey covered with white and orange spots. There is a black border round the edge with a white hairline. Black towards the top with a row of white dots larger than the others.

The undersurface is dark velvety purplish-brown, with cream spots and dashes, especially thick at the sides. The margins are outlined with a row of yellow dots and dashes. The anterior margin is very dark. The gill is pale yellow.

Length of animal 65 mm., breadth 26 mm. Shell almost circular, 10 mm. × 9 mm. Type, Australian Museum.

Locality.—Athol Bay, Sydney Harbour. A single specimen was caught in a 125 foot net by the staff of the aquarium at Taronga Park, in about 10 feet of water, 300 yards from the shore, and presented to the Museum in April, 1931.

Aglaia sanguinea, sp. nov.

(Plate lvi, figs. 6–8.)

Animal very small, soft and smooth, oblong truncate at the anterior end, tapering posteriorly. Anterior disk about the same length as the posterior. The latter tapers off towards the tail, and ends in two lobes, the left much longer than the right. The foot extends to the smaller lobe and its pleuropodial lobes are wide and fleshy. Gill posterior, bipinnate, on the right side between the shell and the foot. The head is represented by small lobes on each side of the mouth, which is large and rounded.

Shell internal, situated in posterior dorsal disk towards the right lobe. It is large for the size of the animal, being about one-fourth the size of the whole animal and fills the greater part of the hinder disk. It is arched and swollen, with curved lines and some slight transverse ones.

In life the animal is a beautiful blue-black colour with rich blood-red spots of different sizes irregularly scattered over the surface. A large spot surrounded by smaller ones is on the head, and a wavy interrupted line extends a little way down the centre of the anterior disk. Down the centre of the long and short lobes of the posterior disk are rows of about six and four respectively larger red spots. Gill pale.

The undersurface is the same colour as the upper, with white spots thickly scattered over the foot. A row of blood-red spots outline the anterior end of the foot and two large ones are on the longest lobe.

The shell is light brown at the apex and paler towards the sides. Inside, the coiled portion is white, the expanded portion light brown.

Length of animal 13 mm., breadth 6 mm. Shell, 3 mm. long, 2 mm. broad.

Type, Australian Museum.

Locality.—A single specimen found under stones in a rock-pool at Long Reef, near Sydney, New South Wales, by Messrs. T. Iredale and G. P. Whitley in November, 1931.

Family PLEUROBRANCHIDÆ.

Genus Pleurobranchæa Leue, 1813.

Pleurobranchæa Leue, de Pleurobranchæa novo Molluscorum Genere, Diss. Inaug., 1813, p. 1–13. Type of genus by present designation, *Pleurobranchæa meckelii* Blainville.

Body oblong, mantle and head smaller than foot. The veil serrated in front and produced into expansions laterally. Rhinophores are situated far apart on the edge of the mantle near the neck portion. The mouth forms a prosboscis. There is a gland on the posterior part of the sole of the foot. The mantle overhangs only on the right side. The mantle folding over the end of the gill produces a siphon. There is no shell. Other characters are the same as those of the genus *Pleurobranchus*. Only a few widely distributed species known.

Pleurobranchæa dorsalis, sp. nov.

(Plate lvi, figs. 4–5.)

Animal oblong, mantle produced forward into a large head with a lateral projection on each side. Mantle not projecting, covering only the central portion

of the animal. Edges slightly wavy. Rhinophores conspicuous, situated on mantle near the neck and far apart, slit, and rolled. Foot very large and expansive, truncate in front and produced far beyond the mantle to a rounded tail. Gill rather small, bipinnate, inserted about the middle of the mantle between it and the foot.

Colour of the animal in life was a rich purplish-brown. The ground colour was lighter brown with darker purplish tinges over the mantle and main portions of the head flaps. There are dark purplish patches on the foot. Over the whole surface is a fine network of black reticulations. Rhinophores are light brown. Small white patches are scattered over the surface, especially round the head and sides and posterior end of mantle near the siphon. Gill plume pale. Foot paler, with dark patches, junction of foot and mantle dark.

Length of animal 40 mm., width 20 mm.

Locality.—Several specimens were dredged in a few fathoms of water at Yarra Bay, Botany Bay, near Sydney, by Mr. Tom Iredale in October, 1927. Specimens have been found also at Bottle and Glass Rocks, Sydney Harbour, in 4–5 fthms.

The specimens from Botany Bay were placed in the aquarium at the Australian Museum, where they laid some eggs. The egg-coil was a single circular convolution about 30 mm. across, the actual girdle containing the eggs being 90 mm. long and 5 mm. wide. It was dead white in colour and the eggs were enclosed in capsules arranged in irregular rows, which showed through as dark tracings. The egg-girdle took about one and a half hours to lay.

Sixteen days after laying, black specks were noticed in the girdle and when this was examined under the microscope the embryos were seen whirling furiously round in the capsules. A few days later these had all dispersed in the water. The slugs disappeared before they could be preserved, but notes and colour sketches had previously been made.

Only one species of *Pleurobranchœa* had previously been recorded from eastern Australia, *P. maculata* Q. & G., which, however, is quite distinct from the species described above. The latter somewhat resembles in colour the New Zealand *P. novœzealandiœ* Cheeseman.

Suborder NUDIBRANCHIATA.

Family DENDRODORIIDÆ.

Genus **Dendrodoris** Ehrenberg, 1831.

Dendrodoris Ehrenberg, Symbolæ Physicæ, 1831, not paginated, but on p. 94. Type by subsequent designation *Dendrodoris lugubris* Ehrenberg (Gray, Proc. Zool. Soc. Lond., 1847, 164).

Rhacodoris Morch, Journ. de Conch., 3, Ser. iii, 1863, 34. Type by original designation, "*Doris laciniata* Cuvier".

Doridopsis Alder and Hancock, Trans. Zool. Soc. Lond., Vol. v, Pt. 3, 1864, 125. Type by original designation, *Doridopsis gemmacea.*

Haustellodoris Pease, Amer. Journ. Conch., v, 1871, 299; for the *Doridopsis* of Alder and Hancock.

Dendrodoris davisi, sp. nov.

(Plate lvi, figs. 13–14.)

Animal oblong-ovate, soft with wide crenulated mantle. The whole dorsal surface is covered densely with large, soft, raised pustules, and smaller ones between them. Rhinophores conspicuous, fat and club-shaped, situated close to the anterior margin, and retractile into large, rounded, somewhat raised cavities. Branchial opening wide, circular, and slightly raised. Gills wide, bushy, placed well towards the posterior margin, five in number, retractile to about the cavity edge. The anus is situated at the end of a tube, which protrudes between the two posterior gills. Foot very broad, grooved at the anterior end, upper lip joined to small, circular, pore-like mouth. Oral lobes flat, inconspicuous, close together, merely folds.

The general colour of the animals varies from pale yellow to vivid reddish-orange, but a rich orange is the usual colour. The whole central dorsal surface is a very dark greenish-brown with dashes of orange, red, dark brown and white upon it. The orange pustules seem to be ringed with dark brown. A dense ring of dark markings surrounds the dorsal central portion. In some specimens white lines surround the pustules. These are particularly in evidence after the slug has been in captivity for some time. Dark brown irregular lines and dashes extend from the central dorsal surface towards the margins. The margins are light orange. Rhinophores orange, white-tipped. Gills yellow to pale orange, usually a little paler than the ground colour of the individual specimen. Edge of branchial cavity whitish.

The undersurface is the same ground colour as the dorsal surface, but sometimes a little paler. Reddish-brown patches and oblong spots are on the undersurface of the mantle. These are very faint in some specimens. The markings form irregular bands from the edge of the foot to the mantle margins, with small brown spots between them. Mouth and oral tentacles pale. Foot pale orange.

Length of animal 36 mm., breadth 21 mm. Type specimen, Australian Museum collection.

Locality.—Specimens of this species have been collected under stones in rock pools in the last few years at Long Reef, and Pittwater, near Sydney (Mr. G. P. Whitley and Mr. M. Ward), Pussy-cat Bay, near Cape Banks, Botany Bay (Mrs. W. J. Dakin and self), and at Bulli, N. S. Wales (Mr. Consett Davis, Mr. F. D. McCarthy, and self).

This little slug, one of the most noticeable and showy found in New South Wales, resembles somewhat *D. nodulosa* Angas, specimens of which I have seen alive, but differs from it in being much more pustulose generally, and particularly in the central dorsal surface. That portion of *D. nodulosa* is entirely smooth and this character is constant.

The species varies in its ground colour. Specimens brought from Bulli by Mr. McCarthy ranged from pale yellow to rich orange-red. The smaller ones were the paler, and it was noticed that the orange-red ones faded to orange when deprived of nourishment. The gills had the ground colour of the individual. The white markings which were scarcely visible when first removed from their natural surroundings increased when the animal was in stale water.

Dendrodoris albobrunnea, sp. nov.

(Plate lvi, figs. 9–10.)

Animal elongate-oval in shape, smooth and soft with no trace of large pustules, slimy. Mantle wide, somewhat crenulated. Rhinophores laminated, set well forward towards the anterior end, retractile into rounded non-raised cavities. Gills seven, bushy, retractile into a rounded cavity near the posterior margin. A thick tubular anus protrudes between the two posterior gills.

Foot large, reaching well down towards tail tip. Anterior portion grooved, upper lamina joined to mantle. Mouth a fine pore. Oral tentacles indistinct, in some specimens represented by small folds.

Internally, the slug has all the characters of a typical *Dendrodoris*.

In life the animal varies from a dirty white to yellowish-cream, especially round the margins of the mantle and foot. The whole dorsal surface is covered with conspicuous brown spots of irregular size, intermingled with fine brown speckling and dashes. Here and there are light grey patches, surrounded by small brown spots. The large brown spots are arranged in more or less regular lines from the anterior margin to the posterior. The rhinophores are yellowish streaked with brown and with white tips. Gills are light yellow marked with brown.

The foot is slightly paler than the upper surface, with a pale yellowish margin. A series of small, dark, irregular sized spots and dashes surround the foot on the mantle and extend up the sides of the foot. There are a few indistinct spots towards the mantle margins. The sole of the foot is unmarked.

Length in spirit of a well preserved specimen, 65 mm., breadth 30 mm. Type specimen, Australian Museum collection.

Locality.—Six specimens were found under coral on North-west Islet, Capricorn Group, Queensland, in 1931, by Mr. G. P. Whitley, who made colour notes on it in life. The specimens have preserved very well, and even now their colouring is practically the same as in life.

Family DORIDIDÆ.

Genus **Discodoris** Bergh, 1877.

Discodoris Bergh, Jahrb. deut. malak. Gesell., 1877, p. 61. Type designated by O'Donoghue (Trans. Roy. Canad. Instit., No. 34, Vol. xv., Pt. 2, 1926, 207) *Discodoris boholiensis* Bergh, Malac. Unters. Semper. Reisen Archipel. Phillip., 1877, 519. Bohol, Philippines.

Discodoris palma, sp. nov.

(Plate lvi, figs. 11–12.)

Animal roundly-ovate, large and soft, with a wide, crenulated margin. Whole surface densely covered with minute pustules, especially in the central dorsal surface. Rhinophores long, retractile into slightly raised pustulose cavities. Gills retractile into a rounded cavity, edges not definitely divided into lobes but only suggested, six in number. Anus situated between the posterior two.

The foot is of medium breadth, upper edge deeply grooved. Oral tentacles long and thin, conspicuous.

Radula is a ribbon-like strip, 3 mm. in length, consisting of about twenty-one rows of numerous, long, thin, sharply curved teeth.

The jaws are minute, 1 mm. long, and yellowish.

The general colour of the animal is a very pale light grey-fawn on the dorsal surface, with darker irregular patches of speckling scattered over it, especially thick round the edge of the central dorsal portion, and becoming smaller but denser towards the margins. The central area is darker in colour than the mantle. Rhinophores are pale at the base, dark towards the middle, and have white-tipped tops. The gills are pale yellow-buff with brown speckling, their stalks pale grey streaked with brown.

The undersurface is pale bluish-grey, with small, dark, chocolate-coloured, irregular-sized spots scattered over it and fine minute specks between them. These spots are more dense on the mantle round the foot. Some spots are scattered over the centre of the foot.

Length of animal 50 mm., breadth 34 mm. Type, Australian Museum.

Locality.—Pussy-cat Bay, near Cape Banks, Botany Bay, N. S. Wales (coll. self), under stones at low tide, Feb., 1932.

This is the first time the genus *Discodoris* has been recorded from N. S. Wales.

Family POLYCERIDÆ.

Genus **Nembrotha** Bergh, 1877.

Nembrotha Bergh, Semper Reiss., Heft xi, 1877, p. 450: ibid., xvii, 1890, p. 980. Type designated by O'Donoghue, *Nembrotha nigerrima* Bergh (Journ. Linn. Soc. Zool., xxxv, 1924, p. 567).

Small limaciform animals, with smooth bodies, rather raised in the central region. There is no definite dorsal margin between the back and the sides, although some species may show a suggestion of it. Body without dorsal and frontal appendages. Foot narrow, elongated into a narrow tail posteriorly, bluntly rounded at the anterior end. Rhinophores retractile. Branchiæ non-retractile, 3–5 in number, strong and stout, situated about the centre of the dorsal surface and almost surrounding the anus. Oral tentacles small. Radula very narrow, with square central tooth and large hamate lateral tooth on each side; the remaining teeth are generally squarish plates without hooks. No jaws as a rule, but minute ones may be present in some species. Hermaphrodite gland spread over the liver.

This genus and its nearest ally, *Trevelyana* Kelaart, form a small group of the Polyceridæ, and are recorded chiefly from the Indo-Pacific, where they are found between tides under stones. *Nembrotha* differs from *Trevelyana* in having only four to five gills instead of the larger number, not less than ten, of the latter genus. Internally, instead of the hermaphrodite gland being divided into globules as in *Trevelyana*, it is spread over the liver. They also differ in the radula.

O'Donoghue (Journ. Linn. Soc. Lond. Zool., Vol. xxxv, No. 237, 1924) suggests that there may be a possibility of *Nembrotha* Bergh, 1877, being replaced by *Angasiella* Ang. and Cross., 1864. The form described by the latter is very much like those in Bergh's genus, and Bergh himself includes it as a doubtful member of the genus. So far I have not seen a specimen of the genus *Angasiella*, so for the present am unable to follow up this suggestion.

Basedow and Hedley (Trans. Roy. Soc. South Australia, Vol. xxix, 1905) record one species of *Nembrotha* (*verconis*) from St. Vincent Gulf, S. Australia, and O'Donoghue (Journ. Linn. Soc. Lond. Zool., Vol. xxxv, No. 237, 1924, p. 521)

includes *Nembrotha purpureolineata* O'Don., a slate-grey species with purplish-brown bands, in his report on the Opisthobranchs from the Abrolhos Is. The following species adds another one to the Australian list.

Nembrotha livingstonei, sp. nov.

(Plate lvi, fig. 15.)

Animal small, with a smooth limaciform body, raised in the centre, produced to a tail posteriorly, and rounded anteriorly. Rhinophores retractile into raised cavities with lobes, inserted at the edges of a light-coloured, star-shaped patch. Branchiæ strong, stout and stumpy, four in number, sparsely foliated, situated almost in the centre of the dorsal surface, and forming a semicircle round the anus.

The general colour of the animal is dark cocoa-brown, with small irregular sized rich indian red spots scattered over the sides and dorsal surface. These appear smaller in size, though not less numerous, near the branchial area and towards the central dorsal area. The rhinophores are white at their base, with electric blue tips, and are situated on the sides of a conspicuous star-shaped patch of pale yellow, a portion of which extends down to the anterior frontal margin. The branchiæ are cream on the inner side, and on the outer side brown. Their bases are electric blue. The large area on which they are placed is yellow like that round the rhinophores, but it has an electric blue border surrounding it. The foot is a dirty white. The narrow radula is light straw coloured. No trace of jaws could be found.

The specimen, which has become much wrinkled in preservation, is now 16 mm. long, 9 mm. high to the base of the branchiæ, and 6 mm. broad. Type specimen, Australian Museum.

Locality.—A single specimen collected at Broome, West Australia, by Mr. A. A. Livingstone, who noted its colours in life. The ground colour of the animal has not faded to any extent, but the red spots are now paler and the electric blue has faded to a dirty white.

EXPLANATION OF PLATE LVI.

Aglaia taronga Allan.
Fig. 1.—Animal.
Figs. 2-3.—Inside and outside view of shell.

Pleurobranchæa dorsalis Allan.
Fig. 4.—Animal.
Fig. 5.—Egg-girdle and young larva.

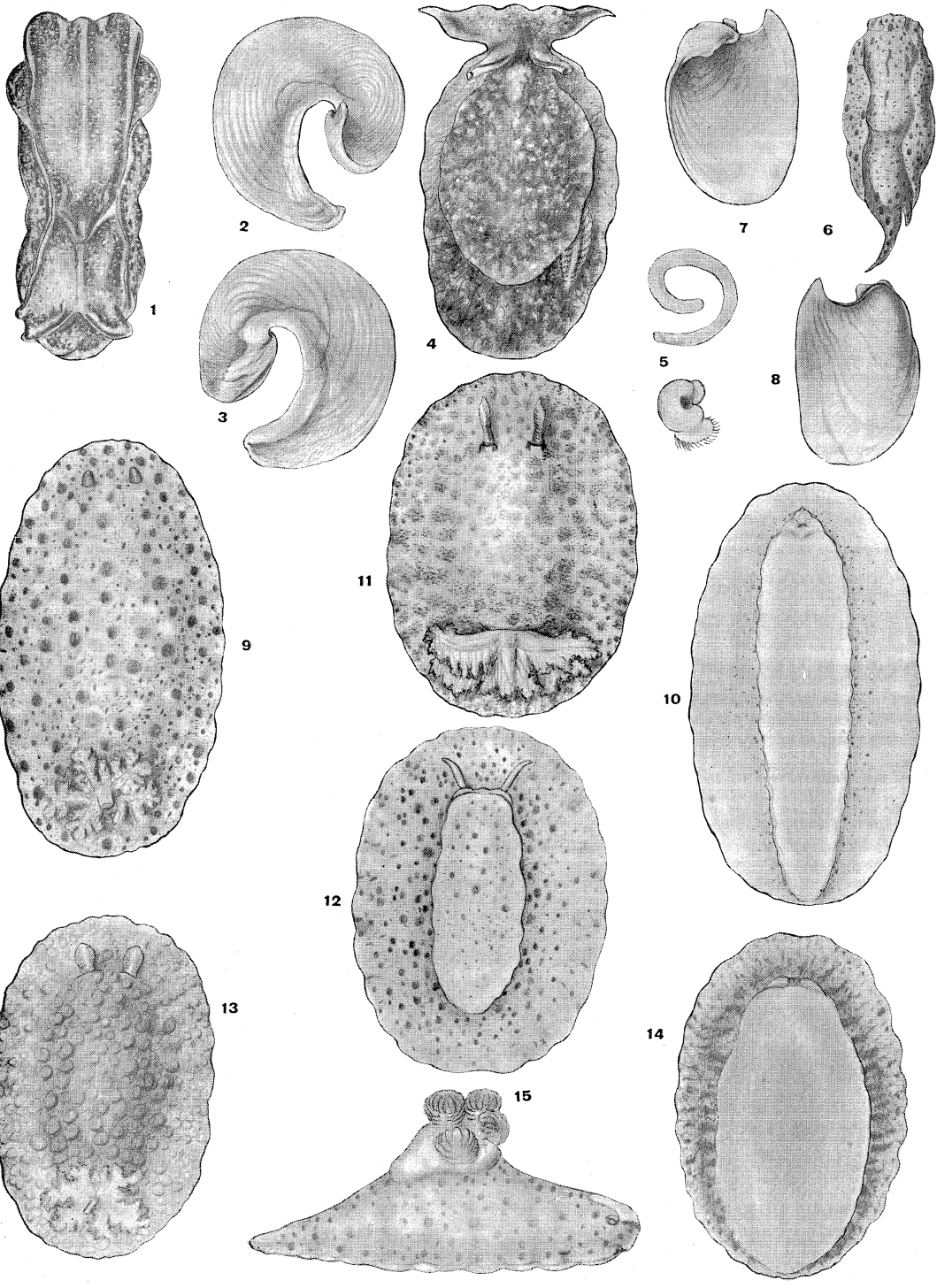
Aglaia sanguinea Allan.
Fig. 6.—Animal.
Figs. 7-8.—Inside and outside view of shell.

Dendrodoris albobrunnea Allan.
Figs. 9-10.—Dorsal and ventral view.

Dendrodoris palma Allan.
Figs. 11-12.—Dorsal and ventral view.

Dendrodoris davisi Allan.
Figs. 13-14.—Dorsal and ventral view.

Nembrotha livingstonei Allan.
Fig. 15.—Side view.



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