

AUSTRALIAN NUDIBRANCHS.

By JOYCE K. ALLAN,

Assistant in Conchology, Australian Museum, Sydney.

(By permission of the Trustees, Australian Museum.)

(Plates iv. and v.)

Those who have had experience in collecting nudibranchs, or sea-slugs, know the disappointment that always accompanies their preservation, when their beautiful colours and shape rapidly go. This is probably the reason why the study of this group has been neglected more than that of any other group of molluscs. Much of the earlier work on the group is based on preserved specimens taken from Australia by early zoologists and naturalists attached to expeditions to this part of the world, so that material from the same regions was sometimes described by systematists working independently in different countries. Moreover, in many cases new species were described without figures and from specimens of which the locality and colour were unknown, so that the earlier names and descriptions require to be revised.

The only work done locally in the earlier days was by George French Angas, who made water colour sketches from life of Sydney nudibranchs, which he collected while residing there. Many of these were new and were published, with descriptions, by Crosse, in *Journal de Conchyliologie*, Ser. 3, Tom. 4, 1864, p. 43. This useful paper is excellent for identifying some of the commoner nudibranchs of Sydney Harbour.

Basedow and Hedley (*Trans. Roy. Soc. S. Austr.*, Vol. xxix., 1905) give a list of the known Australian nudibranchs, with remarks on, and descriptions of new South Australian species. They also give a historical sketch of the early collectors and authors. Since then no additions of importance have been made to this list.

For some years Risbec has worked extensively on the nudibranchs of New Caledonia, but few of the species he has dealt with so far resemble the northern Australian ones.

It is my intention, therefore, to publish from time to time notes on species of interest which are already in, or come to, the Museum collection. Some unidentified species in the collection have entirely lost their colour, and therefore I think it wiser to leave these as doubtful species until others are obtained from the same localities.

Several specimens collected locally in the last few years and brought alive to the Museum have enabled me to make colour sketches and notes of the living animal for future reference.

The recent expeditions to the Great Barrier Reef, Queensland, have been most profitable, and the collections made have included many new and interesting slugs. These are accompanied in most cases with notes on their habits and colours, which have considerably helped me in their identification.

When living specimens are studied, all the species so far met with have been identifiable at sight and very little variation has been found in them.

I wish to thank Mr. Melbourne Ward and members of the Museum staff for their kindness in collecting sea-slugs for me at every opportunity, and, in particular, Mr. G. P. Whitley, whose notes and figures of the live animals he collected have been of great assistance. I am also indebted to Mr. T. Iredale for the help he has given me in preparing this paper, and

to the Director of the Taronga Zoological Park for allowing me to keep material in the Aquarium and to study sea-slugs collected and placed there by members of the aquarium staff.

Genus DISCODORIS Bergh, 1877.

Discodoris Bergh, Jahrb. deut. Malak. Gesell., 1877, 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.

Flat, oval or elongate-oval animals, their surface finely granulose or tubulose, but smooth to the touch and much softer than *Platydoris*. The mantle and foot are fairly broad. Rhinophores retractile; branchiae generally six in number, retractile into a rounded, sometimes stellate cavity. Foot is grooved and notched on the upper lip. They have an extraordinary habit of discarding portion of, or the whole of their mantle when handled to any extent. The remaining part of the animal appears able to live for some days without this discarded portion. The Discodorids are almost world-wide in their distribution, and are often found under stones or coral reefs. In colour they are generally yellow or light brown, with darker markings.

DISCODORIS WHITLEYI, n.sp.

(Plate iv., figs. 1 and 2.)

Animal elongate-oval, squarish at the anterior end, and rounded posteriorly; body very soft, mantle ample and inclined to break away from the central portion. Whole surface covered with minute granulations, which are inclined to rub off in the preserved specimen. The tentacles are conspicuous, club-shaped and laminated on the upper portion, and are retractile into large rounded slightly raised cavities. The branchial plume consist of six tripinnate branchiae, retractile into a large rounded and slightly raised cavity which is not divided into definite lobes. They are set round a tubular elongate anus, which protrudes between the two posterior gills.

The foot is widest anteriorly, tapering to a more rounded shape posteriorly, the tail projects a little beyond the mantle edge when the animal is crawling, although in preserved specimens it shrinks up and does not give this idea of projection. It is fairly broad, with slightly crenulated edges. The upper lamina is conspicuously divided, and the oral tentacles are long and linear.

The general colour of the animal in life is yellowish cream, with irregular sized patches of dark brown colour scattered over the whole of the dorsal surface. These patches, which are smaller, though more numerous towards the margins, are composed of stipulations of dark colour, and are easily rubbed off in the preserved specimens. The club-shaped portion of the rhinophores is rich black, and the lower portion whitish. The stems of the branchiae are the same, yellow-cream, as the body, veined and tipped with dark brown, and when protruding slightly from the branchial cavity appear very dark. Under surface slightly paler than the upper, the only contrasting marking being numerous irregular sized small dark brown patches along the under marginal end of the foot.

Dimensions: Length, 40 mm. Breadth, about 16 mm. in life.

Locality: North West Islet, Capricorn Group, Queensland. Type specimen (C. 57,205), Australian Museum collection.

Two specimens of this easily recognised animal were collected in May, 1931, by Mr. G. P. Whitley, after whom I have named it, and who kindly made excellent colour notes and a sketch of the larger one for me while it was alive. These have been most helpful to me in preparing my drawing and description, as the specimens have considerably lost their colours and character after only a very few weeks in preservative.

Genus *PLATYDORIS* Bergh, 1877.

Platydoris Bergh, Jahr. Malak. Gesell., 1877, 73.

Very flat, oval-shaped animals, with a peculiar hard leathery texture. The dorsal surface is minutely granulated and rough to touch. The branchiae are five, six or seven in number, tripinnate, and retractile into a cavity, which is usually divided into a corresponding number of lobes, and which converge together when the branchiae are retracted. The foot is narrow and grooved in front. They are almost world-wide in distribution, and are found under stones at low tide on coral reefs, where they wedge themselves into rock crevices, often assuming the shape of the crack in which they live. Very lethargic in their movement, and common in tropical seas.

Iredale and O'Donoghue (Proc. Malac. Soc. Lond., Vol. xv., Pt. iv., 1923, 195) point out that Bohadsch (Anim. Mar., 1761, Cap. iii., 65-74, Taf. v., figs. 4-5) made the genus *Argus*, which he did not specifically name, but described well, and which *D. argo* was based upon. This genus was later named *Platydoris* by Bergh, on the contention that *Argus* Bohadsch, was not available. Under the present rules they consider that *Argus* must be accepted instead of *Platydoris*.

I have seen Bohadsch's description, and I find that my species agree more with Bergh's description of the genus *Platydoris* than with that of Bohadsch's *Argus*, so prefer to leave them under the former generic name.

PLATYDORIS IREDALEI, n.sp.

(Plate iv., figs. 3 and 4; plate v., fig. 3.)

Body oval, firm, leathery, flattened, mantle wide, with edges slightly crenulated, dorsal surface smooth to touch, but very finely granulated, with minute rounded tubercles. Rhinophores with bulbous tips completely retractile into deep cavities, margins of which are raised and denticulate, laminated. Branchiae six, completely retractile, set round an elongated, thin tubular centrally placed anus; cavity margin formed of six irregular-sized contractile lobes, the direct anterior and posterior ones being the largest. Foot narrow, rounded in front and behind, wider posteriorly than anteriorly, about one-fourth the width of the body, and extending further towards the anterior than the posterior margin. Shallow groove in front, upper lamina a little enlarged and divided medially. Oral tentacles small, flat, and rounded.

Colour in spirit light creamy brown, with cloudings of dark brown intergranular markings. This marking is in some specimens very dark and in others lighter, and forms dark irregular network patches which are easily rubbed off the preserved animal. Branchiae same pale colour streaked with dark brown. Rhinophores pale yellow.

Undersurface has ground colour as above, perhaps a little paler, sole of foot same colour as the mantle expansion. The sides of the foot are closely and minutely speckled, with the dark granular speckling which appears on the dorsal surface. This is the only marking appearing on the under-surface.

Dimensions: Length of spirit specimen, 90 mm. Breadth, 60 mm.

Habitat: Masthead Reef, Capricorn Group; Green Island, off Cairns, Queensland (coll. C. Hedley); Michaelmas Cay, off Cairns, North Queensland (coll. T. Iredale and G. P. Whitley); North-West Islet, Capricorn Group, Queensland (coll. G. P. Whitley and M. Ward).

Type specimen, Masthead Island (C.19,088) in Australian Museum collection.

I think I am justified in giving a new name to this species from Queensland, which Basedow and Hedley (Trans. Roy. Soc. S. Austr., Vol. xxix., 1905, 140) recorded from Queensland as *Platydoris coriacea* Abraham, (P.Z.S. Lond., 1877, 247), an identification which does not satisfy me, as Abraham describes his species from Seychelles, South Africa, and Sir Charles Hardy's Islands.

In a footnote to his descriptions of new species in this paper, Abraham observes that a few of the descriptions may relate to forms already named by other observers, and adds that none of the hitherto published diagnoses can be definitely referred to any of the animals about to be described by him. Basedow and Hedley note that *P. coriacea* Abraham, is suspiciously like *P. scabra* Cuvier (Cuvier, Ann. Mus. d'Hist. Nat., iv., 1804, 466, Timor). Cuvier's description is slight, and as no figure is given is rather unsatisfactory. Basedow and Hedley probably based their decision on Quoy and Gaimard's figure and description (Quoy & Gaimard, Voy. de l'Astrolabe, 1832, pl. 18, figs. 1-4) of a species found at Tonga, New Guinea and Vanikoro, to which they doubtfully give the name of *P. scabra* Cuvier.

Mr. Whitley, on his recent trip to North-West Islet, kindly made colour notes of the live specimens to compare with the illustration of Quoy and Gaimard's species. He found the former was much the same colour in life as when preserved—perhaps a little darker. The ground colour was dirty creamy-white, with smoky grey-brown patches irregularly disposed over the surface. The rhinophores are light brown-yellow at their bulbous tips. The undersurface is creamy-white, except in the crevice between the foot and the mantle, which is thickly dotted with grey-brown speckling.

The foot is not bright yellow, with lavender sides, as in Quoy and Gaimard's figure, of the species they doubtfully call *P. scabra* Cuvier, nor are the rhinophores red-tipped, and the whole surface has not the lavender tinge over it, but has a definite creamy-brown appearance.

The specimens Mr. Whitley collected were found tightly wedged in rock crevices, their shape coinciding with that of the crack in which they lived, and were most difficult to detect, as they closely resembled the colour of the surrounding rock.

According to his footnote, Abraham did not consider his species similar to that of Cuvier, and Basedow and Hedley preferred to identify the Masthead Reef and Green Islands specimens as *P. coriacea* Abraham, instead of *P. scabra* Cuvier, and, although they noted a similarity between these two species, by preferring Abraham's name, they must have found that species compared more favourably with theirs than the former did. Also, Quoy and Gaimard's species may not even apply to that of Cuvier, who has made identification difficult through the want of a figure and a better description. As the Platydorids are so alike in texture and shape, the colour plays a large part in the differentiation of species, and once that has vanished many species would be hard to separate. As Abraham made no dissections, the specimen he records from Sir Charles Hardy's Islands may be similar to the Queensland ones under discussion, but through preservation may be superficially like the South African and Seychelles specimens.

I prefer to leave the name *P. coriacea* Abraham, for the South African, and the Seychelles species, *P. scabra* Cuvier, for the species of Cuvier, and, perhaps, of Quoy and Gaimard, and for the Queensland specimens propose the new name *iredalei*.

PLATYDORIS CAPRICORNENSIS, n.sp.

(Plate iv., figs. 5 and 6.)

Animal small, flat, subcircular. Mantle with widely extended border. The presence of numerous close minute subequal tubercles give a granulated appearance to the dorsal surface. Rhinophores clavate, retractile within deep cavities, the margins of which are well raised and crenulated. The portions of the rhinophores showing in the cavities have well-marked laminations, which probably extend along their upper halves. Branchiae six, tripinnate, set round a long thin tubular anus, the contractile cavity containing them having a six-lobed margin. Oral tentacles short, flat and wide at their base. Foot fairly narrow, width about one-third that of the animal; rounded at both ends; shallow transverse groove at anterior end; upper lamina divided centrally.

The colour of the spirit specimen is, in general, orange-tan, with a reddish underlying tinge. On the upper surface are two definite rows of irregular sized black-brown patches of colour encircling the animal. These patches are formed by minute speckling of dark colour, situated between the granular tubercles. In the centre of some of the patches the colour has weakened, leaving the outer edge dark, and in some places having a dark ring only. Between these two rows, smaller patches are scattered. The markings are confined principally to the mantle and the lower sides of the body. They are absent on the central dorsal surface, except for a slight suggestion of colour in front of the branchial plume.

Undersurface same colour as above. No dark blotches present, except a very faint suggestion of the dark colour on the sides of the foot posteriorly. Rhinophores lighter in colour, tips orange. Branchiae pale, streaked and tipped black-brown. Oral tentacles pale yellow.

Dimensions: Length of spirit specimen, 20 mm. Breadth, 16 mm.

Habitat: North-West Islet, Capricorn Group, Queensland.

Type specimen (C. 57,207) in Australian Museum collection.

Described from a single specimen collected by Mr. Melbourne Ward in May, 1930. No colour notes were made at the time, but it was probably much richer and darker in colour when alive. As this beautiful little specimen shows all the external characters of the genus *Platydoris* Bergh, and lack of other specimens prevents me making a dissection at present, I have placed it in that genus.

Genus DICTYODORIS Bergh, 1880.

Dictyodoris Bergh, Reis. Arch. Phil., Bd. ii., Pt. 3, Suppl. 1, 1880, 75-78; L.C., Bd. ii., Pt. 2, 1103.

Oval-shaped animal, with wide mantle, texture rather leathery, but surface smooth. Branchiae few, usually four, small, bi-pinnate, and retractile into a rounded cavity. Rhinophores retractile. Foot only slightly grooved in front, or not at all. Back ridged, the main ridges often bearing large tubercles.

DICTYODORIS AURANTIOMACULATA, n.sp.

(Plate iv., figs. 7 and 8; plate v., figs. 8-10.)

Body broad, rounded anteriorly and posteriorly, elevated in the centre, fleshy, mantle edges thin, surface smooth to touch. Along each side of the

dorsal central portion is a row of large elongated pointed fleshy protuberances, which in the live specimen are very erect. A dorsal medial ridge extends from anterior to the rhinophores to half-way between the branchial opening and the posterior mantle margin, commencing and ending with a protuberance and with three large ones arranged along it, each one placed about half-way between those on the side rows. The elevated protuberances and the raised ridges formed by the medial line roughly divide the central dorsal area into five slightly sunken compartments.

From each side of the first anterior protuberance a fleshy ridge runs out towards the mantle margin and on both sides of the dorsal surface; a similar ridge runs from each of the protuberances to the side mantle margins, and from each posterior one, situated on either side of the branchial opening, two ridges run, one to the sides, and one to the posterior margin. A ridge connects the extreme posterior medial protuberances with the branchial opening and the posterior mantle margin.

The branchiae and rhinophores are completely retracted in the single specimen found. The opening of the former is small, with regular non-elevated edges. Those of the latter are close together, on either side of the central ridge, and are round and raised. The branchiae, four in number, are very small and stumpy, with a broad rachis, and are divided at their tops into about five small groups. They are situated two on either side of the tubular anus, and the two posterior ones are partly divided into two a little way from the tops. The undersurface of the animal is smooth, with a narrow small foot, which does not extend to the margins. It is broadly rounded anteriorly and slightly narrower posteriorly. Lip well divided, upper lamina forming wide lobes. Oral tentacles conspicuous, linear and narrow at the apex.

A vividly coloured and most conspicuous animal, with the ground colour milky opalescent, and the upper surface covered with rich orange-yellow lines, and large irregular-sized oval spots of the same colour, outlined with deeper orange. Along the medial ridge runs a yellow band, interrupted by the fleshy protuberances, which are milky-white, with yellow tops. A similar yellow line extends along the ridges from the protuberances along the sides, broadening as they approach the outer edge of the margin, which is edged with yellow. The raised upper portion of the dorsal surface is outlined with interrupted orange lines, and the branchial and rhinophore openings are encircled with similarly coloured elongated markings.

Between each raised ridge on the mantle are roughly three very large oval spots in a row with much smaller ones on either side of them, growing smaller near the margins. A rich lavender-blue tinge shows through the central portion. The tips of the branchiae and rhinophores seem light brown. The undersurface is the same ground colour as the upper, with the edges of the mantle and foot outlined with orange-yellow. The tips of the oral tentacles are also orange-yellow. The spots on the upper surface faintly show through on the border of the undersurface.

Since preparing the above description of the preserved specimen, I have examined a photograph of the live animal taken by Mr. M. Embury when it was collected. It had not apparently had time to change to any extent in preservation. In the photograph, the protuberances were longer and more erect, and the large and small spots seemed to be situated on the tops of soft blister-like pustules. In the preserved specimen, this effect was noticed on the mantle just below the raised central portion, but out toward the margin the tendency disappeared, leaving only coloured spots. The

tips of the rhinophores were peeping out, but the branchiae were retracted beyond sight. Both Mr. A. A. Livingstone and Mr. W. Boardman, who brought the specimen back from North-West Islet, told me they did not at any time see the branchiae exerted.

Radula light yellow coloured, about 42 rows hooked, crowded and slightly denticulate teeth, increasing in size outwards. Formula, 54.0.54.

Dimensions: Length in spirit, 77 mm. Breadth, 56 mm.

Habitat: Brought back to the Australian Museum by Messrs. A. A. Livingstone and W. Boardman from North-West Islet, Capricorn Group, Queensland, where it was collected by Master Embury in January, 1931. Type specimen, C. 57,208.

I experienced difficulty at first in determining the genus for this species. The soft raised ridges with lines of colour seemed to ally it with *Halgerda* Bergh, but the branchiae differentiated it. Eliot (Proc. Malac. Soc., vi., Pt. 4, March, 1905, 229), describing species of *Dictyodoris tessellata* Bergh, from Madagascar, adds that he thinks that genus should be united with *Halgerda* and which seems to have priority of name. His specimens have three dorsal ridges, bearing three or four tubercles, which are connected by secondary ridges extending towards the margins. The margin is outlined with a coloured border. The main character, however, is the four branchiae, two on each side of the anus, and each with a thick rachis. These are similar to the branchiae in the North-West Islet species. I prefer to place my species in the genus *Dictyodoris* Bergh, rather than in *Halgerda* Bergh.

Genus *ASTERONOTUS* Ehrenberg, 1831.

Asteronotus Ehrenberg, Symbolae physicae, 1831, not paginated, but on p. 97; Bergh, Jahr. Malak. Gesell., iv., 1877, p. 45, 161.

Oval animals of large size, with a very leathery texture. The dorsal surface is quite smooth, but bears large ridges and lumps. The branchiae are large and bushy, five to six in number, and are retractile into a cavity, which is usually divided into a corresponding number of convergent lobes. Rhinophores retractile. Foot broad, upper lamina divided generally into flaps. Mouth large.

ASTERONOTUS BRASSICA, n.sp.

(Plate v., figs. 12-14.)

Animal very large and heavy, with rounded elongated mantle, widely extended and thin towards the edges and irregularly shaped in places. Dorsal surface covered with ridges and large pustules. A wide raised ridge extends down the centre of the dorsal surface from between the rhinophores and terminating near the branchial plume. From this ridge, wide globular ridges extend towards the margins, about three on each side, which after preservation partly divide into large protuberances. A row of large blister-like protuberances extend down the sides of the dorsal central portion parallel to the median line. Round the marginal edge are rows of narrow parallel ridges which break up here and there into small pustules. Rhinophores large and retractile into ample cavities, with raised crenulated edges. Branchial cavity large and raised with six convergent lobes; branchial plume very conspicuous, bushy, six-gilled and retractile to about level of lobes. Foot broad and long, extending well down towards posterior end, truncate anteriorly, narrow and rounded posteriorly. Upper lamina divided; formed into two large flaps. Mouth very large, inner portion sometimes protrudes. Oral tentacles large, flat and leaf-like.

Colour bright cabbage-green, with margins and surface of lumps

lighter in tone. Narrow marblings of lavender-blue are along the sides of the central ridge and encircle the larger protuberances. Gills light brown; rhinophores greyish-green. Undersurface light greenish-yellow; foot more brown than the mantle. Encircling the foot on the mantle is a broad band of dark colour. A margin of confluent blobs of the same dark colour extends round the mantle edge.

Odontophore, dark coloured and broad, with 41-43 rows of hook-shaped broad teeth elongated at their base. Formula, 54.0.54.

Dimensions: Length in spirit, 155 mm. Breadth, 115 mm. (Average specimen). In life much larger.

Locality: Numerous specimens collected between May, 1930-May, 1931, by Messrs. A. A. Livingstone, W. Boardman and M. Ward, at North-West Islet, Capricorn Group, Queensland. Type specimen (C.57,210) in Australian Museum collection.

This species resembles somewhat the description of *Asteronotus mabilla* Abraham (P.Z.S., 1877, 249, pl. xxviii., figs. 1-4, from the Seychelles and Samoa), but is much larger than it and has larger though fewer protuberances and ridges. On the undersurface of *A. mabilla* there is only one dark coloured band which is exactly half-way between the foot and the mantle edge. The definite two bands of the North-West Islet specimens are situated immediately round the foot and round the mantle edge. The odontophore in the former is about 26 rows, as against 41-43 in the latter.

Basedow and Hedley (Trans. Roy. Soc. S. Australia, Vol. xxix., 1905, 141) placed *A. mabilla* Abraham, on the Australian list from Sydney Harbour. I have examined this specimen, which is in the Australian Museum collection, and have found it smaller, narrower and flatter than the northern one. Its original colour has completely gone, and it is now a pale cream all over, including the branchiae. The dorsal surface is covered with small pustules, as in Abraham's figure, and not large ridges and protuberances, as in the species described above. I am doubtful, however, whether this specimen came from Sydney Harbour. It has apparently been in the collection for many years, and the only data supplied is "Port Jackson" on a small label. As the nudibranchs hitherto found in that locality have been only small ones, I think that the late Charles Hedley would have made some reference to it in that, or some other paper, if such a large one had appeared. Knowing how well he always labelled material, especially if collected by himself, the insufficient data on the label makes me think that it was collected elsewhere, with other material, and had become separated from it. It is remarkably like a single specimen of *Asteronotus* in the collection from Port Darwin, Northern Territory, which is the same pale cream colour.

Mr. A. A. Livingstone collected a single specimen at Cape Leveque, W. Australia, 6 in. x 4 in. in size, resembling somewhat the North-West Islet ones, but it has only a single extremely broad dark band of colour round the foot, extending from the margin of the foot almost to the mantle border. There are, besides, only five branchiae in the five-lobed cavity, and the foot is narrower than the former species. To me it seems to resemble more the figure of *Asteronotus cespitosus* (Van Hasselt) (Notes of the Leyden Museum, Vol. ix., 1887, 307, pl. 6, fig. 9) from Java, a browner species than the North-West Islet one, a fact which Mr. Livingstone also noticed in his live specimen, and the sculpture seems smaller and more compact. The specimen has lost its colour far more rapidly than the Barrier Reef ones, although preserved in the same manner. Until I see

more specimens of it, I cannot say whether it is a variety or the same thing.

There is a possibility that the specimen collected by Mr. Livingstone at Cape Leveque may be an adult form of O'Donoghue's *Asteronotus fuscus* from Abrolhos Island (Journ. Linn. Soc. Lond. Zool., Vol. xxxv., 551, pl. 28, figs. 12-13). This species is only 27.5 mm. long by 15 mm. wide, has five branchiae, is muddy brown colour in spirit, and in life dirty brown, with some lighter brown spots.

ASTERONOTUS WARDIANUS, sp. nov.

(Plate iv., figs. 16 and 17.)

Body rather large, flat, elliptic. Mantle with wide extended border, thin at the edge; dorsal surface smooth, and, though flattened somewhat with preservation, shows irregular-sized blister-like pustules, becoming smaller and confluent towards the outer edge, and with suggestions of ridges running from the centre outwards. Rhinophores conspicuous and closely laminated well down their length, retracted into slightly raised cavities, the thickened edges of which show a very slight crenulation. Branchiae six, retractile, set round a fairly long sturdy tubular anus, enclosed in a six-lobed contractile cavity, lobes irregular in size. Oral tentacles conspicuous, flat and leaf-shape. Foot fairly long and medium size; width about one-third that of body, widest in the middle, with suggestion of blister-like pustules, truncate in front and roundly truncate behind; transverse groove at anterior end deeper than in most genera; upper lamina extending well beyond it and divided medially.

The colour of the spirit specimen is purplish-brown, with darker markings. A central dark interrupted band seems to extend from between and in front of the rhinophores, along the back to just in front of the branchial cavity. This band appears in parts to be pupilled with a lighter colour. From it other dark markings extend out in patches and rows towards the margins, and are scattered over the surface. A very dark border encircles the edge of the mantle. Tops of the rhinophores are the same purplish brown colour, the edges of their cavities dark. Branchiae and anus very light colour tipped and streaked with the body colour. Undersurface milky-white, shading to blue-white towards the margin. A wide interrupted chocolate brown band of irregular-sized blotches encircles it about half-way between the mantle edge and foot. The outer edge of the mantle is very dark purple-brown. Numerous smaller pale brown spots are scattered about the dark band, with faint bluish ones towards the margins. Foot very pale brown, with purple shading towards the outer edge. Sides of foot rich purple-brown, becoming brown at the junction of the mantle. Oral tentacles light purple-brown. Upper lamina edged with same dark colour as the body.

Odontophore: About forty rows of broad teeth; formula, 40.0.40.

Dimensions: Length of spirit specimen, 90 mm. Breadth, 60 mm.

Habitat: North-West Islet, Capricorn Group, Queensland. Type specimen (C. 57,206) in Australian Museum collection.

Described from a single specimen collected in May, 1930, by Mr. M. Ward, after whom I have named it. No colour notes were made at the time, but Mr. Ward informed me that it was a very striking and richly coloured animal when alive. The undersurface should make it easily recognisable, with its milky ground colour, band of brown blotches and dark marginal border.

The general shape, tentacular and branchial cavities and oral tentacle are similar to those of *Platydoris*, but the absence of minute granulation, an important character of this genus and the evident presence of larger pustules on the dorsal surface of the species just described, separate it from that genus. The nearest genus to which I can place it is *Asteronotus* Ehrenberg. Eliot (Proc. Zool. Soc. Lond., 1903, Pt. 2, 360) gives a good guide to be followed for the placing of doubtful genera, and this I have taken into consideration when placing, perhaps temporarily, the present species in *Asteronotus*.

Genus DENDRODORIS Ehrenberg, 1831.

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

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

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

Haustellodoris Pease, Amer. Journ. Conch., Vol. vi., 1871, 299; for the *Doridopsis* of Alder & Hancock.

Large animals, with soft, smooth, often gelatinous bodies, brightly coloured, and generally covered with soft warts and blister-like pustules. Rhinophores retractile, branchiae bushy and large, about 5-8 in number, wholly or partly surrounding the vent, retractile into a common cavity. Foot very broad, oral tentacles small and often represented by small folds. Mouth a small pore, through which a suctorial tube protrudes as a proboscis. There is no radula. A genus, comprised of numerous species, which usually inhabit tropical seas and are found under stones.

In 1860, Pease (Proc. Zool. Soc. Lond., 1860, 32) created the genus *Doriopsis* for a small oblong or oval depressed *Doris* characterised by the position of the branchiae, which are placed in a semi-circle on the posterior end of the dorsal surface, convex side caudad, and retractile into a similar-shaped slit. In 1864, Alder and Hancock (Trans. Zool. Soc. Lond., Vol. v., Pt. 3, 1864, 125) made the genus *Doridopsis* for a species with a large mantle, rhinophores and branchiae retractile within cavities, no oral tentacles, mouth suctorial, opening in the front of the margin of the foot, without tongue, jaws or collar, and with a retractile proboscis.

The former genus has usually been considered a synonym of *Doriopsis*, but on reading the original description of the two genera, it is seen that Pease's description refers to an entirely different genus, a fact which Mde. A. Pruvot-Fol (Bull. Mus. Nat. d'Hist. Nat., 2, Ser., Tom. 11, No. 3, March, 1930, 291) also notes. Risbec (Contribution a l'Etude des Nudibranchs Neo Caledoniens, 1928, 102) also realised that *Doriopsis* was a different genus to *Doridopsis*, and placed *Doriopsis viridis* Pease, into a new genus he created, *Guyonia*. I think that *Doriopsis* could still stand, however, for those species with the branchiae and other characters described by Pease, and that *Guyonia* becomes a synonym of it.

O'Donoghue (Trans. Roy. Canadian Instit., No. 34, Vol. xv., Pt. 2, 1926, 203) points out, however, that the genus *Dendrodoris* Ehrenberg, 1831, which Bergh (Journ. Mus. Godeffroy, Heft xiv., 1878, 21) puts aside as unsatisfactory in favour of Pease's name of 1860, is the same as *Doridopsis*, and therefore takes precedence over it. The "quite false characters" which Bergh finds in Pease's genus are the very ones which separate it from *Dendrodoris* and *Doridopsis*.

DENDRODORIS GUNNAMATTA, n.sp.

(Plate v., figs. 4-7.)

Body fairly narrow and elongate, rounded, very soft and gelatinous, mantle extended all round, edges thin and crenulated. Dorsal surface covered with large irregular-sized globular pustules, becoming smaller at the edges. In the spirit specimen these form a more or less definite pattern on the back, as follows: Along each side of the back is a row of three large tubercles, rugose on the top, and each encircled by about six much smaller ones, uniting just before the rhinophores to a single row of two similar constructions, which extends to the anterior border. Similar processes are on the border, and smaller tubercles are scattered over the whole surface. Rhinophores long and slender, upper portion diagonally laminated, retractile in cavities, with edges raised into a short sheath formed of about four tubercles. Branchiae large and bushy, five, tripinnate, set round a large tubular, independently retractile anus, which is situated slightly posteriorly between the two posterior branchiae interrupting the branchial circle. Cavity large and fleshy, formed of five elevated lobes, which seem to bear smaller tubercles. Foot very long and broad, in most of the spirit specimens extending well beyond the mantle posteriorly, and in others reaching almost to it. Margin slightly crenulated, truncate in front, rounded behind, edges thin, a very slight anterior margin groove, lamina divided by a protruding proboscis, which in some specimens does not protrude, but shows the mouth as a small pore. Lamina attached to the head; anterior to it are two small flat rounded and free flaps which serve as oral tentacles.

Colour of the spirit specimen is dirty yellowish grey. Edges of mantle yellow. A greenish grey tinge appears on the large tubercles. On the centre back, between the two rows of tubercles is a longitudinal row of three large irregular-shaped patches of dark slate colour. The shape is formed by the joining of the tubercles around them. Within most of the dark patches is a central lighter patch, with sometimes a small black spot within it. This paler patch I think is caused by the dark markings becoming faded in spirit, commencing with the centre of the coloured mark. Another row of five such markings runs along each side of the body from the front of the rhinophores to behind the branchiae, the last two posterior ones on each side uniting practically as one big blotch. The area enclosed within the slaty patches is not so tubercular as the remainder of the surface, and at first glance appears almost smooth, because the tubercles are much smaller and flatter. Upper portion of the rhinophores slaty-brown, with tips and lamination marks yellow, lower portion transparent colour. Branchiae stalks light yellow, streaked and tipped with slate-brown, giving them a dark appearance. Anus almost black. Undersurface lighter than dorsal, edges of mantle yellow, with dark patches on it, which seems to mark the bases of the surface tubercles. Foot greenish-grey, edges yellow, underneath same colour as above. Oral flaps dark, edged with yellow.

Dimensions: Length of spirit specimen, 70 mm. Breadth, 40 mm. Height, 20 mm. As the specimens have not curled at all in preservation, these measurements are practically the same as in life.

Habitat: About fifty specimens were collected at the one time on the mud flats at Gunnamatta Bay, Port Hacking, N.S. Wales, by Mr. T. Iredale and party, from the Australian Museum, in May, 1925. Mr. Iredale noted that a few were found in early May in shallow water at the edge of the sandy mud patch on the flat, and in later May when the larger number were collected they were lying exposed, and noted apparently burrowing in

the mud to keep themselves moist until the tide returned. Two were secured in November, none in March, and plenty in May. The latter month is probably near the breeding time.

Type specimen in Australian Museum collection (C.51,204).

A colour sketch of the live animal was made at the time, but has since been mislaid. I remember it as a very velvety, rich blue, almost blue-black creature, with extremely soft, large blister-like pustules over the surface, which did not appear to fall into any definite arrangement as they did in the preserved specimen. Also, there were no decided dark blotches, except the summit of the tubercles, which seemed a little darker. In his notes, based on his visits to Gunnamatta Bay, Mr. Iredale says it has a large dark bluish body surface, with pale greenish tubercles scattered irregularly over the surface. The rhinophores are club-shaped and completely retractile, brownish-red in colour, the tips with whitish lines. Branchiae rich reddish-brown. Foot elongate, pale brown, longitudinally lined with blue, the blue sometimes extending from one line to another. The edge of the foot is yellowish, a narrow band extending round, but vanishing towards the tail. The underside of the mantle shows a crinkled edge, with dark spots appearing as eye-spots.

When alive, I had seen nothing like this species, but since being preserved its surface has so settled into a definite pattern that it somewhat resembles the sketch of *Doridopsis mammosa* Abraham (P.Z.S. Lond., 1877, 266, pl. xxix., figs. 20-21. Habitat (?): Obtained during Antarctic Expedition). The body in the latter seems more convex, the pustules smaller, although more elongated, and the rhinophore cavities raised sheath-like, whereas in the species under discussion the pustules are large, soft blister-like, the body is narrow, flatter and elongate, and the rhinophores are retractile into rounded cavities, edges of which are merely formed by a few tubercles and are not sheaths. Practically all the specimens from Gunnamatta Bay are between 60-70 mm. in length. As Abraham's species has no definite locality, and in view of the differences already noted, I consider the former a new species of *Dendrodoris*.

DENDRODORIS MELAENA, n.sp.

(Plate v., fig. 11.)

Body soft and velvety, and when extended elongate and bluntly truncate at each end. Mantle margin very wide and thrown into numerous large folds. The posterior end rather wider than the anterior end. The surface of the body is covered with soft blister-like pustules, which are only noticed when inspecting closely. Rhinophores are well separated, reaching beyond the margin of the mantle when extended, retractile, laminated. Branchiae bushy and conspicuous, seven in number, reaching beyond the side mantle edges, retractile into a rounded cavity. Foot very broad, extending well to the posterior end of the mantle. Mouth a circular pore. Oral tentacles rudimentary.

Colour of the animal when alive is a rich dark velvety black, with an occasional bluish bloom on the upper surface. Mantle margin has a narrow edging of pale yellow-brown. Rhinophores black, white tipped. Branchiae black, tipped and streaked with pale yellow-brown. Undersurface lighter than the dorsal, with a milky tinge on the foot. The edges of the foot and mantle are outlined with the same light brown tinge as above. A similar coloured area surrounds the mouth.

Dimensions: Length, 25 mm. Breadth, 12 mm.

Locality: Found under a rock at Long Reef, near Sydney, N.S. Wales, by Mr. G. P. Whitley, in October, 1930. Another specimen was found by Mr. T. Iredale at Queenscliff, not far from Long Reef, some years before, and which I figured at the time. It was placed in the Museum aquarium, but unfortunately disappeared. It was a larger specimen, 37 mm. long and 22 mm. broad, but was otherwise identical with the Long Reef one.

DENDRODORIS MORULIFER, n.sp.

(Plate v., figs. 1 and 2.)

Body very soft and large, roundly oblong, the mantle well extended, marginal edges thin. Dorsal surface covered with numerous very large protuberances, the surface of which is composed of smaller tubercles, making the protuberances resemble somewhat a mulberry in the spirit specimen. One of these protuberances is situated between and anterior to the rhinophores and almost on the mantle margin. Two more are in a row on the central median line, commencing posterior to the rhinophores. Half-way down this line is a suggestion of another, and posterior to the branchiae a large one overhangs the mantle margin, making five in all along the central dorsal line. About five similar large protuberances form a line on either side of the central row, each one being situated between those on the middle row. A well marked one is on each side of the central anterior gill, and one on either side of the posterior gills. Along each side of the dorsal surface fairly large blister-like pustules surround the larger protuberances and fill up the gaps dividing them. The thin edges of the mantle are overhung by these pustules, which are extremely numerous and crowded round the margin and immediately posterior to, and anterior to, the rhinophores. There is only a suggestion of these pustules on the dorsal central surface. In the spirit specimens, rows of lines encircle the base of the protuberances, but it is difficult to say whether in life these are colour markings, ridges, or small faint tubercles. The rhinophores are retractile, large and conspicuous, laminated, and with a tendency to bend backwards. Their openings are wide and the edges are outlined with small pustules. The branchial plume is large and bushy and is slightly withdrawn into an ample cavity, the margin of which is pustulose, a little elevated and faintly divided into five lobes. The branchiae are divided well down to their base, tri-pinnate, five in number, with a free space between the two posterior ones. The retractile anus is situated in its own cavity, slightly posteriorly and practically between these two. The foot is long and broad, with a tendency to pustulation, rounded at the anterior end and narrower towards the posterior end. The margins are thin and slightly crenulated. The head is small, with no sign of an anterior marginal groove. Oral tentacles are small, inconspicuous flaps on the side of the head. Mouth a minute pore.

The colour of the spirit specimen is dark slaty-green, with the large protuberances and some of the pustules very light brown. Many of the pustules round the mantle seem light colour, with dark green centres. The rhinophores are light brown. Central dorsal surface very dark. Branchiae very dark greenish colour, lighter tipped. The undersurface should make identification of this species simple. It is greenish-slate colour, becoming pale towards the centre, and has numerous large rounded and oval spots scattered over the surface. These, in the spirit specimen, are milk white, with a suggestion of a thin dark ring encircling each. They may have been yellow in life and resemble in their shape and position on the mantle those on the undersurface of *Doris tuberculata* Q. & G. (Voy. de l'Astrolabe,

Zool., 2, p. 248, pl. 16, figs. 1-2) from New Guinea. A narrow darker band of colour is on the mantle round the foot. The foot is a slightly lighter shade than the ground colour of the undersurface.

Dimensions: Length in spirit, $5\frac{1}{2}$ inches. Breadth, 4 inches.

Locality: A single specimen brought back from North-West Islet in January, 1931, by Messrs. A. A. Livingstone and W. Boardman, who were unable to give me any idea of its colour in life as it was collected by another member of the expedition on the islet at that time, and was placed in the jar set aside for the nudibranchs, without their knowledge. Type specimen (C. 57,212) in Australian Museum collection.

DENDRODORIS RAINFORDI, n.sp.

(Plate iv., figs. 14 and 15.)

Animal large, plump, softly rounded. Dorsal surface covered with large irregular-sized blister-like tubercles, bearing smaller ones on their surface, and becoming smaller and more congested towards their edges. Margin crenulated. Rhinophores pointed at tip, one retracted in specimen, and the other not, pointing backwards, laminated; cavities raised and rounded. Branchial plume large, conspicuous and bushy, seven in number, tripinnate, not fully retracted in specimen, set in a slightly raised cavity, the edge of which shows an inclination to form faint lobes. Anus, independently retracted, and set well back against the wall of the cavity, between the two posterior branchiae. Foot long and very broad, roundly truncate in front and behind, margins crenulated. No pronounced groove at the anterior end; upper lamina divided, forming ample flaps. Oral tentacles inconspicuous, small folds which do not project freely. Mouth small and pore-like.

The whole undersurface, including the foot, is covered with the same blister-like tubercles as on the upper surface.

Colour of the spirit specimen is light yellowish-brown, with large round irregular-sized purplish-brown rings scattered over the surface. These rings contain within them numerous small spots and lines forming more or less designs, and giving a hieroglyphic appearance to them. There are six large ones on the central dorsal surface, two about three-quarters of an inch in diameter are situated immediately in front of the branchiae, two a little larger in the centre, and two more before the rhinophores. A much smaller one is between the rhinophores and a similar-sized one is anterior to them. A row of fairly small ones encircles the body where the mantle commences, from the rhinophores to the branchial plume. Immediately posterior to the branchiae is a large purplish-brown blotch. Smaller ones of similar colour appear at intervals amongst the rings along the mantle. The margin of the mantle has a band of large and small rings, about thirteen in number, encircling it.

Undersurface paler than dorsal, the pattern on the mantle margin the same as above, as though it was showing through. Foot dark purplish-brown in centre, shading to paler colour towards the edge, with a few dark rings on it, which, as in the case of the mantle edge, appear in the same position on the undersurface. Branchiae light coloured, heavily streaked and tipped with dark brown, giving them an almost purplish appearance. Rhinophores purplish-black, white tipped.

This very handsome and conspicuous animal which was found floating on the surface of the water by Mr. E. Rainford and presented to the Australian Museum by him would be easily recognised on account of its

large dimensions, large branchial plume, and the extraordinary markings on its surface.

As only one specimen was found by Mr. Rainford and is still the only one in the Museum collection, I do not think it is advisable to dissect it. The specimen has curled up considerably in preservative, giving to the margins of the mantle and foot an exaggerated crenulated appearance, which would not exist to such a degree in life.

Dimensions: Length in spirit, $6\frac{1}{2}$ inches. Breadth, 4 inches.

Habitat: Port Denison, Queensland. Type specimen (C. 49,974) in Australian Museum collection.

The markings on the surface of this species resemble somewhat those seen in the figure of *Kentrodoris annuligera* Bergh (Bergh, Reis. im. Archipel der Philippines von Semper, 1892, Heft. viii., Taf. lxxxv., fig. 8 and Heft. viii., Taf. xli., fig. 1, 1875), but their external characters alone dissociate them.

Genus POLYCERA Cuvier, 1816.

Polycera Cuvier, Regne Animal, Vol. ii., 389, "1817," i.e., December, 1816.

Type by subsequent designation, Gray, Proc. Zool. Soc. (Lond.), 1847, 165; *Doris quadrilineata* Muller.

Themisto Oken, Lehrb. Naturg. Th., iii., Zool., Pt. 1, x., 278, 1815. Type, *Doris quadrilineata* Muller. Not *Themisto* Oken, Goetting, gelehrte Anz., 1807, 1168.

Cufaea Leach, Synops. Moll. Great Britain, 21, December, 1852. Type by monotypy, *Doris flava* Montagu.

Conspicuous and active animals, usually with vividly contrasting colours on the body. Limaciform shape, with no definite mantle, but the body is marked by a ridge at the sides, which continues round the head. The front part of this ridge forms a veil and bears elongate processes or tubercles. Branchiae generally simple, but may be bi- or tripinnate, with usually one or more appendages on either side of them. The branchiae and rhinophores are retractile. The body swells a little in the centre where the heart is. Mouth large, foot linear. Their range extends throughout the European seas, but previous to the writing of this paper the genus does appear to have been recorded from Australian waters.

They are found among sea-weeds in rock-pools and on floating timber and wharf piles.

POLYCERA CONSPICUA, n.sp.

(Plate iv., figs. 12 and 13; plate v., fig. 15.)

Animal slender, elongate, a little swollen in the middle and tapering to a long pointed tail behind, smooth, transparent, white in colour, the internal organs showing through produce a greyish-pink appearance in parts. Rhinophores large and conspicuous, subclavate, set fairly far apart, broad at base, bending slightly backward, upper part with about twenty-eight laminations, grooved down the centre, black, with base and tips smooth and white, non-retractile, and about the same length as the frontal appendages. Frontal veil well expanded and ornamented with six bright yellow elongated pointed appendages of more or less equal length, situated three on either side, the posterior pair in a line with the rhinophores. Branchial plume large, erect and conspicuous, situated about midway along the animal and just behind a small swelling containing the heart. When fully expanded, it stretches well beyond the side body margins. It consists of eleven simply-pinnate tapering branchiae, the two posterior ones very small, and the central anterior one the largest. Colour black.

with stems whitish and tips yellow. On each side of the branchial plume is a single large bright yellow tentacle of the same appearance, but about twice the size as the frontal appendages, and with base whitish. Foot linear, grooved down centre, lobed in front, sides slightly undulated, white. Mouth large.

A broad black line extends along centre of dorsal surface, from between the two anterior frontal appendages to just behind the branchial plume. Another similar black line extends along each side of the body underneath the last pair of frontal appendages to about midway between tip of tail and branchiae. The black line on the right side is interrupted by the presence of the genital opening. A narrow bright yellow line runs along dorsal surface of the tail, from the tip almost to the termination of the central black line. A line of similar length and colour extends along the upper outer margin of the tail.

Dimensions: Length, 2 inches. Breadth, $\frac{3}{8}$ inch. Type, Australian Museum collection. Registered No. C. 57,211.

Habitat: Sydney Harbour, N.S. Wales. About eight specimens in all have been brought to the Museum since 1927. Previous to that year there had been no specimens in the collection. Some of them were found by members of the crew of the Harbour Trust launches, when examining wharf-piles for borers, and were attached either to the piles or brought up on sea-weed, usually between the months of September and May. One specimen was dredged off Watson's Bay, Port Jackson, by Captain Comtesse, of the dredge "Triton," in September.

This conspicuous little animal is easily recognised by its beautifully marked body and large erect black waving branchiae, broad black bands along the sides and centre, contrasting bright yellow frontal appendages and body tentacles. It is far more active than the Dorids, and uses its tail freely for attaching itself to sea-weed or any object it comes in contact with, and with it as an axis is able to revolve into many positions. One specimen had the two body tentacles divided at their bases, but as all the other characters were the same I think this was only an aberration.

Resembles somewhat *Polycera capensis* Quoy & Gaimard (Voy. "Uranie," Zool., 1824, 417, pl. 66, fig. 4), from the Cape of Good Hope, but this species has the frontal tentacles much smaller, and the black lines on the body do not extend to such length as those in the Sydney Harbour species, and are not so conspicuous.

It also resembles the sketch of *Polycera nigrocrocea* Barnard, from S. Africa (Ann. S. Africa. Mus., Vol. xxv., 1927, pl. xix., figs. 7-8), but several differences separate them. The latter species seems to me to be very close to *P. capensis* Q. & G., and, considering the localities of the two, it would be nearer that species than the Sydney Harbour one.

Genus NOTODORIS Bergh, 1875.

Notodoris Bergh, Journ. de Mus. Godeffroy, Heft. viii., 1875, 64-67, 196-197, Taf. ix., figs. 32-45, Taf. f., 1-8. Eliot, Fauna and Geography of the Maldivé and Laccadive Archipelagoes, Vol. ii., Pt. 1.

Animal limaciform in shape, with no clear distinction between the back and sides. Body surface is hard, rough and rugose. Frontal veil ample. The branchiae are small and are protected by a large valve, which is sometimes elaborately divided and subdivided. The rhinophores are smooth and are sometimes also protected by valves. Very few species are known, and they are all yellow in colour, sometimes with darker spots or markings on the dorsal surface. It has been noticed in some cases that

they resemble in colour and general appearance the vivid yellow sponge on which they are sometimes found. Professor W. J. Dakin found that what seemed at first sight to be small pieces of brilliant lemon-yellow sponge falling off a straggling mass of lemon-yellow sponge at the Abrolhos Is. were really nudibranchs of the same vivid colour, resembling the sponge also in general appearance. These were the species of Notodorids, discussed by O'Donoghue, and mentioned below. On the other hand, the species found commonly at North-West Islet, Capricorn Group, crawled about amongst rock crevices, where it showed out most vividly against the contrasting background, and made no attempt to conceal itself. They are found in tropical seas, and so far very little is known of their habits.

The genus was created by Bergh for a single species, *N. citrina*, from Raratonga. Eliot obtained another at Zanzibar (*N. minor*) and with his *N. gardineri* from Hulule, Maldives Islands, the species described below from North-West Islet, Capricorn Group, brings the known species to four. O'Donoghue (Journ. Linn. Soc. Lond. Zool., 1924, Vol. xxxv., No. 237, 565, pl. 28, figs. 13-19; pl. 30, figs. 62-64) describes a species from the Abrolhos Is., Western Australia, which he attributes to *N. gardineri*. Three specimens of this species were obtained, and he therefore records the genus for the first time from Australian waters. The Barrier Reef species is the first record of the genus from the east coast of Australia.

NOTODORIS MEGASTIGMA, n.sp.

(Plate iv., figs. 9-11.)

Body limaciform, lengthening to a tail which forms almost half the length of the entire animal. Hard, rough and rugose, with a large, rounded frontal veil. The body is covered with irregular-sized thick heavy protuberances, somewhat flattened on their apex, and the larger ones rugose on their upper portions. They are arranged in a row round the frontal veil along the upper sides of the body as far as the branchial lobes, about twelve in number, and diminishing in size around the veil. Two similar rows run down the central dorsal area, from anterior to and between the rhinophores to the branchial lobes. A series, somewhat smaller in size, extends from the area surrounding the anus down the centre of the tail to its tip, and along the sides of the tail and body are several rows of smaller protuberances. The area round the anus is well covered with very small ones.

The rhinophores in the specimens are completely retracted, their openings being protected by a valve. The numerous, rather small non-retracted gills are well protected by a large conspicuous branchial lobe, composed of three parts, each of which is clearly divided and furnished with small irregular-shaped leaf-like processes. In the spirit specimens, the gills protrude slightly beyond the branchial lobe in parts. The flat foot occupies the whole undersurface. Oral tentacles, flat and broad, are hidden by the overhanging veil.

The colour is vivid yellow, with large black spots and patches scattered over the dorsal surface, and smaller and more minute ones intermingling. A very large patch extends across the central portion immediately behind the branchial lobes, another one placed on the side of the central dorsal protuberances, midway between the branchial lobe and the frontal veil, and a smaller one anterior to the right rhinophore valve. A spot of similar size to this is posterior to the anus, and a very large elongated patch is on either side of the central tail ridge, with a few smaller spots posterior to it. There are no colour markings on the undersurface.

In another specimen there is a black spot anterior to each rhinophore valve, with two more posterior to them, and the large patch on each side of the tail ridge is divided into spots instead of being entire. The spirit specimens have faded to a light greenish-grey, with the branchiae the same colour, and the black patches commencing to fade towards the centres.

Odontophore, dark colour, about 45 rows of long curved teeth, large at sides.

Dimensions: Length of spirit specimen, 65 mm. Breadth, 20 mm.

Habitat: Two specimens brought back by Messrs. A. A. Livingstone and W. Boardman from North-West Islet, Capricorn Group, Queensland, in January, 1931, who assert that it was the commonest sea-slug seen on the island at that particular time. It was found crawling among coral crevices, making no attempt to conceal itself, and its vivid colour showed out most strikingly. Specimens were also collected in 1930 at North-West Islet by Mr. Melbourne Ward. Type (C. 57,209) in Australian Museum collection.

The species somewhat resembles *N. gardineri* Eliot (Fauna and Geography of the Maldives and Laccadive Archipelagoes, Vol. ii., Pt. 1, 548, pl. xxxii., figs. 7-8), but in the latter the spots are very much smaller and fewer, and the ridges mentioned by Eliot on the dorsal surface of his species are replaced by large protuberances in the North-West Islet species. The three specimens described by O'Donoghue from the Abrolhos Is. as *N. gardineri* Eliot, according to the colour notes made by Professor Dakin,

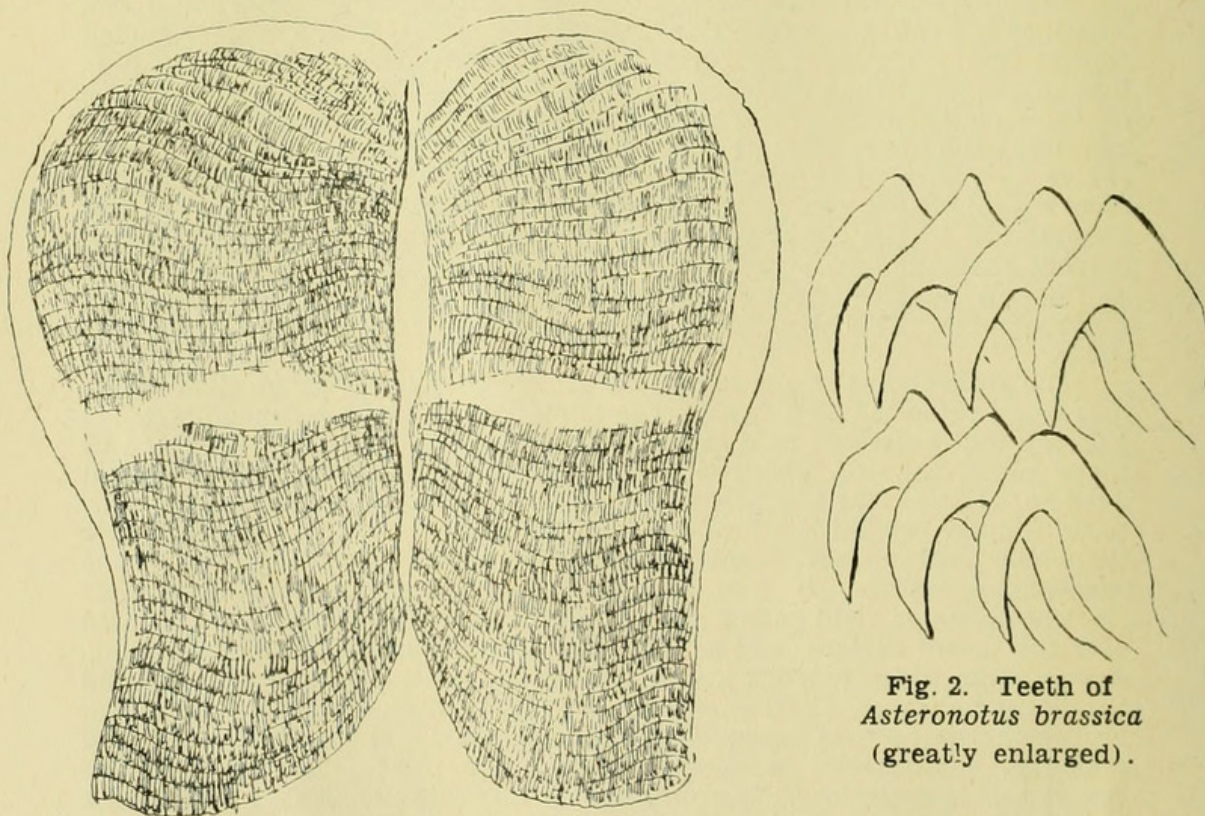


Fig. 1. Radula of *Asteronotus brassica*.

Fig. 2. Teeth of *Asteronotus brassica* (greatly enlarged).

have no black markings, or spots, which are present in the Queensland species.

Both the specimens from the Abrolhos Is. and Eliot's specimen are much smaller in size than the former.

EXPLANATION OF PLATES.

Plate iv.

- Figs. 1, 2. *Discodoris whitleyi*.
 „ 3, 4. *Platydorid iredalei*.
 „ 5, 6. *Platydorid capricornensis*.
 „ 7, 8. *Dictyodorid aurantiomaculata*.
 „ 9, 10, 11. *Notodorid megastigma*.
 „ 12, 13. *Polycera conspicua*.
 „ 14, 15. *Dendrodorid rainfordi*.
 „ 16, 17. *Asteronotus wardianus*.

Plate v.

- Figs. 1, 2. *Dendrodorid morulifer*.
 „ 3. *Platydorid iredalei*. Internal structure.
 b = buccal mass, r = rhinophore, n = nerve centre, o = generative organs, s = stomach, i = intestine, l = liver, k = pericardium, v = ventricle, y = auricle, g = gills, a = anus.
 „ 4, 5. *Dendrodorid gunnamatta*.
 „ 6. *Dendrodorid gunnamatta*. Internal structure.
 b = buccal mass, r = rhinophores, n = nerve centre, o = generative organs, s = stomach, i = intestine, l = liver, k = pericardium, v = ventricle, y = auricle, g = gills, a = anus.
 Figs. 7. Proboscis of *Dendrodorid gunnamatta*.
 „ 8. Internal structure of *Dictyodorid aurantiomaculata*.
 b = buccal mass, r = rhinophores, n = nerve centre, o = generative organs, s = stomach, i = intestine, l = liver, k = pericardium, a = anus, g = gills.
 „ 9. Gills of ditto.
 „ 10. Teeth of ditto.
 „ 11. *Dendrodorid melaena*.
 „ 12, 13. *Asteronotus brassica*.
 „ 14. *Asteronotus brassica*. Internal structure.
 b = buccal mass, r = rhinophores, n = nerve centre, o = generative organs, s = stomach, i = intestine, l = liver, k = pericardium, g = gills.
 „ 15. Internal structure of *Polycera conspicua*.
 b = buccal mass, r = rhinophore, os = oesophagus, o = generative organs, s = stomach, i = intestine, l = liver, g = gills, a = anus.



Allan, Joyce. 1932. "Australian nudibranchs." *The Australian zoologist* 7, 87–105.

View This Item Online: <https://www.biodiversitylibrary.org/item/119322>

Permalink: <https://www.biodiversitylibrary.org/partpdf/49882>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.