Zooids up to 3 mm. long; 1 mm. wide in pharyngeal region which has 16 fine longitudinal muscle bands. Rectal-oesophageal region of medium length. Abdominal region almost the same width as pharyngeal. Vascular processes very long and fine. Branchial aperture with six short lobes, atrial surmounted by a wide lappet.

Pharynx with 16 tentacles of three orders regularly arranged (12 Herdman), dorsal lamina of three short languets, 4 rows of 15 stigmata 8 times as long as wide (5 rows of 12 stigmata (Herdman)—error), and no parastigmatic vessels. Oesophagus of medium length, stomach wide, curved, tapering towards the posterior end, and with slight roughnesses on the internal lining. Intestine long, narrow. Intestinal gland without a reservoir. (Text Fig. 1D).

Colonies of one sex. Gonads on right side of intestine (Text Figs. 1D, 1E). Testis a rosette of 6 to 8 pear-shaped lobes. Ovary with 1 to 5 eggs. Diameter of liberated egg up to 0.33 mm. Brood pouch straight, elongate, thin-walled sac with 4 to 5 embryos, and with an oviducal bend, the arms of which are of unequal diameter. Largest tadpole seen (not free-swimming) 3 mm. long, 0·7 mm. wide in head region, with 2 immature buds, one of which is in process of division (Text Fig. 1F).

An endemic species. All recorded specimens have been found in deep water.

Distribution in Australia: Port Jackson, Port Stephen, and a few attached to carapace of *Macippe spinosa* Stimpson (Herdman), Port Jackson (Aust. Mus. Coll.).

Remarks: In a transverse section of a fully-grown colony the succession of zooids can be traced easily. In one specimen young buds occupied the proximal 2 mm. of the head, mature individuals without brood pouches the next 4 mm., mature individuals with one embryo in the brood pouch the next 2–3 mm., mature individuals with two to three embryos in the brood pouch the next 5 mm., whilst dedifferentiating zooids with four embryos in the brood pouch were found more distally and the true distal end was devoid of zooids.

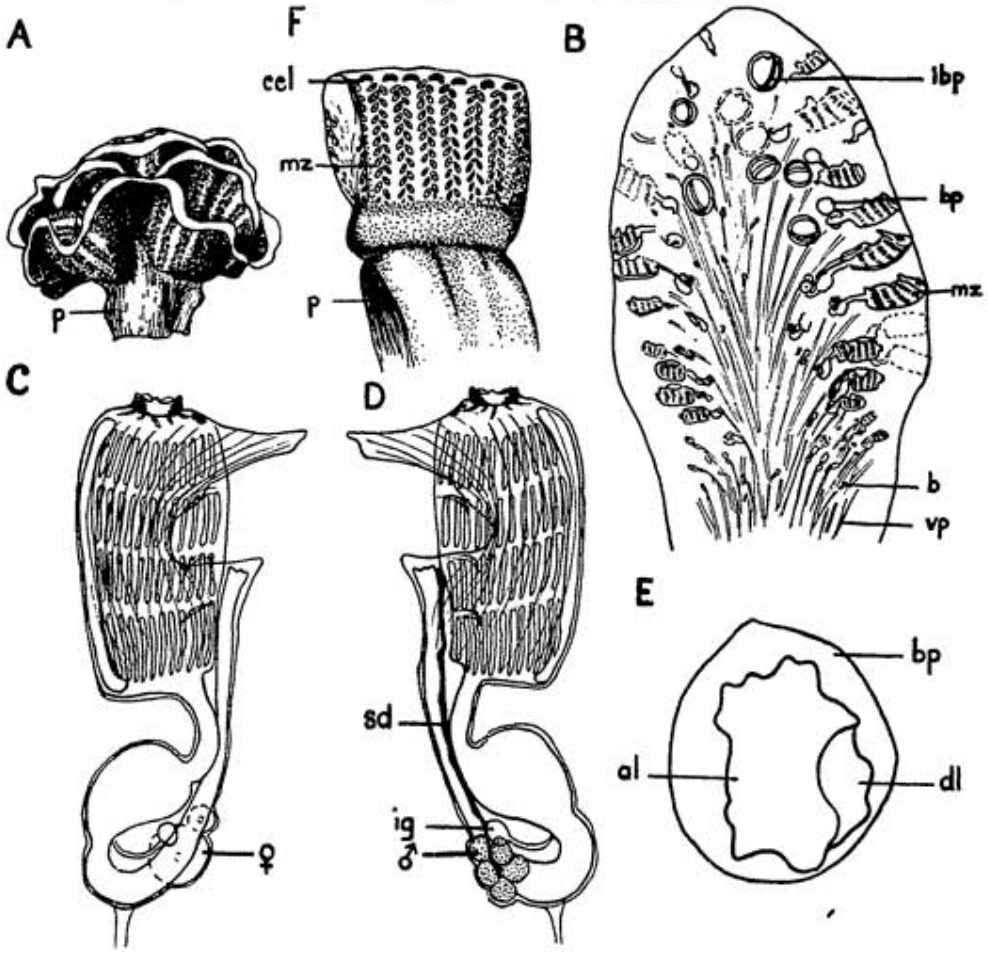
Sycozoa cerebriformis (Q. and Gaim.). (Text Figs. 2A, 2B, 2C, 2D, 2E, 2F.)

Syn: *Aplidie cerebriforme* Quoy and Gaimard, 1834, p. 625, Pl. 92, Figs. 16, 17. *Colella plicata* Herdman, 1899, p. 62, Pl. Dist. II, Figs. 1–15. *Colella incerta* Caullery, 1908, p. 10, Text Fig. 2B. *Sycozoa arborescens* Hartmeyer, 1912, p. 316. *Sycozoa cerebriformis* f. *intermedia* Hartmeyer, 1919, p. 124. *Sycozoa arborescens* Michaelsen, 1923, p. 22. *Distaplia cerebriforme* Michaelsen, 1924, p. 325.

Colonies (Text Fig. 2A) stalked, small ones fan-like, large ones rosette-like and up to 11 cm. in longest diameter. Peduncle firm, short, wide, vertically-flattened, up to 7·4 cm. high, 2·2 cm. thick (average size 3·7 cm. high, 1·0 cm. thick), width varying with form, which may be simple or branched, with branches joined by thin membranous layers of test or less frequently free; colour pale yellowish grey (Herdman, 1899), brownish red (Michaelsen, 1924). Head folded, band-like, wider than the peduncle which carries it, showing all degrees of concrescence between neighbouring portions in forms with branched peduncles, up to 1·1 cm. high, 0·7 cm. thick, 43 cm. wide following all folds (average size, 1·0 cm. high, 0·5 cm. thick, 26 cm. wide following all folds); colour pale yellow, almost white (Herdman, 1899), variable, reddish brown in one (Michaelsen, 1924). Zooids confined to head and absent from the distal extremity of it, in vertical double rows of 9 to 11 (about 6, Herdman) the youngest being nearest the peduncle, those of opposing rows arranged alternately. Common cloacal

apertures (Text Fig. 2F) narrow, crescent-shaped, up to 1 mm. long, situated at the distal ends of the double rows of zooids. Test gelatinous, with numerous small test cells and in the head region a few white pigment cells and numerous bladder cells, the latter being confined to the peripheral region.

Zooids up to 3 mm. long, 1 mm. wide in pharyngeal region, which has 10 to 12 fine longitudinal muscle bundles, 3 transverse. The rectal-oesophageal region bent at right angles, pharyngeal region of zooid lying transversely in test, abdominal somewhat vertically (Text Fig. 2B). Abdominal region slightly narrower than pharyngeal. Vascular process long, thin, arising from left side of abdominal region and passing down into peduncle. Branchial aperture with six short lobes, atrial surmounted by a short, wide lappet.



TEXT FIG. 2.—*Sycozoa cerebriformis*. A. Small colony. × ⅔. B. L.S. head of colony showing young, mature and dedifferentiating zooids and brood pouches with and without embryos. × 6. C. Right side of zooid from female colony. × 20. D. Left side of zooid from male colony. × 20. E. T.S. brood pouch showing oviducal loop. × 160. F. Portion of head of colony showing arrangement of zooids and common cloacal apertures. × 1½.

Pharynx with 8 tentacles of 2 orders of size regularly arranged (10, Herdman), dorsal lamina of 3 short languets curving backward opposite third stigmata from the mid-dorsal line, 4 rows of 12–13 stigmata (3, occasionally 4 rows of 10, Herdman—error) 6 to 8 times as long as wide, no parastigmatic vessels. Oesophagus long, narrow. Stomach smooth-walled inside and out, smaller to-

wards posterior end. Intestine long, narrow. Intestinal gland with a small, round bladder.

Colonies of one sex. Gonads on right of intestine (Text Figs. 2C, 2D). Testis a rosette of 4 to 6 pear-shaped lobes (2 to 10, Michaelsen, 1924). Ovary with 2 to 3 eggs at different stages of development. Liberated egg heavily-yolked, up to 0·37 mm. in diameter. Brood pouch with oviducal loop of which the arms are of unequal diameter (Text Fig. 2E). One embryo only in the brood pouch. Largest tadpole seen (not free-swimming) 1·1 mm. long, 0·3 mm. wide in head region, stigmata formed, but no buds visible.

Recorded from South Africa and Australia.

Distribution in Australia: Port Jackson (Herdman), Gunnemata Bay (Aust. Mus. Coll), Port Western (Quoy and Gaimard, Michaelsen), West Australia, North West Australia (Hartmeyer), South Australia, South East Australia (Caullery).

Elsewhere: South Africa (Hartmeyer, Michaelsen).

Remarks: The presence of more than one egg in the ovary, but only one embryo in the brood pouch is peculiar in a genus where the pouch usually contains several embryos at different stages of development. The obvious conclusion is that after one egg is liberated, the eggs in the ovary which are still immature are suppressed—a conclusion supported by the absence of gonads in zooids with brood pouches containing developing embryos (Text Fig. 2B).

Dedifferentiation of the parent zooid begins during early development of the embryo, with the result that the brood pouches become isolated.

In a transverse section of the colony the succession of zooids is clearly seen, young buds being found near the stalk, maturing zooids farther up the head region, zooids with brood pouches farther up still, and dedifferentiating zooids and isolated brood pouches close to the distal end itself, a region free from zooids (Text Fig. 2B).

Sycozoa murrayi (Herdman), 1886.
Syn: *Colella murrayi*, Herdman, 1886, p. 119.

Whilst the zooid structure is insufficiently described to place this species with certainty in the genus *Sycozoa* and only specimens with male reproductive organs are available, the form of the colony and the arrangement and distribution of the zooids point to its *Sycozoan* affinities.

Distribution in Australia: Off S. E. Coast, v. *rubida* Bass Strait (Herdman).

Genus Distaplia Della Valle, as emended

Distaplia stylifera (Kowalevsky), 1874.
For Syn. see: *Distaplia stylifera*, Van Name, 1945, p. 147.

I have been able to examine two colonies collected on December 12, 1951, from Triggs Island, near Perth. For these I am indebted to Mrs. L. Marsh, University of West Australia. Both colonies show regular distribution of the zooids in round or oval systems of 6 to 12, each system with its own common cloacal aperture. In one colony brood pouches occur at or above the level of the gonad sacs. These contain early tailed embryos, and each is connected to the parent zooid by a narrow neck, not as long as would be thought from Hartmeyer's description (1919) and by no means as long as that seen in *D. australensis* (Text Fig. 3B).