RESEARCH ABSTRACTS FOR 1939

Abstracts of the results of investigations carried on at the laboratory are printed below. The reports have been edited to insure uniformity of style and arrangement, but are otherwise in the form contributed by the authors. (For bibliographic reference to the abstracts it is recommended that the following form be used: "Bull. Mt. Desert Is. Biol. Lab., (year), p. ——.")

REVISION OF THE WORK OF PEARSE AND WALKER ON LITTORAL POLYCLADS OF NEW ENGLAND AND ADJACENT PARTS OF CANADA

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In the 1939 number of this Bulletin there appeared an account by Pearse and Walker of the littoral polyclads of New England and adjacent parts of Canada. This account contains many errors and requires extensive correction. Of the fifteen species listed and figured by them, all but 4, 9, 11, 13, 14 and possibly 5 are in the wrong genera, 10 is wholly misnamed, and 3, 8, 12, and 16, are synonyms of 2, 9, 6, and 13 respectively. Figure 15 does not represent any animal known to me and several of the other figures are either inaccurate reproductions of Verrill's figures or are pieced together from several sources, combining in some cases figures of different species.

Actually 9 species of polyclads are known from the region in question and 5 of these have never been recorded north of Massachusetts.

Concerning Verrill's 2 species *Stylochus frontalis* and *"Leptoplana" angusta* it must be recalled that Verrill obtained these species at Provincetown, Massachusetts, on the bottom of a whaling vessel that had recently come from the Carolina coast, and that they were associated with southern forms. It is, therefore, certain that these 2 species do not belong to the region under consideration and it is probable that they are not even native to the coast of North America. They have never been collected again since Verrill's day. *Stylochus frontalis* was described by Verrill from a single specimen; he figured only the eyes (so that Pearse and Walker's figure 5 is obviously incorrect) and these indicate a stylochid but there is no way of knowing that the animal belongs to the genus *Stylochus*, since the genera of the Stylochidae cannot be determined without serial sections of the reproductive system. I was able to clear up the taxonomic position of *"Leptoplana" angusta* through finding several of the specimens collected by Verrill among unidentified material in the Peabody Museum and the United States National Museum. I found that the animal is not a *Leptoplana* at all but is close to the genus *Stylochoplana* and I

gave a complete account of it under the name *Stylochoplana angusta* (Hyman, 1939a). It is probable that it will eventually be necessary to create a new genus for it, since the common genital atrium has 2 pores to the exterior. Pearse and Walker's figure of this species (fig. 7) is inaccurate.

The key furnished by Pearse and Walker is of little value, since the same species appear therein in several cases under 2 different names, and the distinguishing characters given are frequently erroneous or trivial. In the following account it has been thought better to define the important characters in connection with the descriptions rather than to furnish a key. All the species are fully illustrated and described in my other publications (Hyman, 1939a, b, 1940). The polyclads peculiar to the Sargassum, which may be taken from the floating weed in the region here under consideration, are omitted. They are treated elsewhere (Hyman, 1939a, c). Anatomical terms are defined in a previous article (Hyman, 1939a).

Order Acotylea

Polyclads without a sucker behind the female genital pore; tentacles when present of the nuchal type; eyes never in a pair of clusters on the anterior margin; pharynx typically ruffled (tubular in a few families not represented here); copulatory complex generally in the posterior body half, with uteri extending anteriorly.

Section Craspedommata

Acotylea with a band of eyes along the whole or the anterior part of the body margin; with cerebral and tentacular eye clusters in addition and sometimes also with frontal eyes; or anterior end strewn with small eyes not arranged in clusters (eyes absent or detectable only in sections in some species).

Family Discocelidae

Craspedommata of oval or obovate form with marginal band of eyes limited to anterior body half; tentacles absent; cerebral and tentacular eye clusters present; male organ and male antrum provided with numerous prostatic apparatuses; typical prostate absent. One species known in the region.

Coronadena mutabilis (Verrill) 1873

Syn. *Polycelis mutabilis* Verrill 1873
Discocelis mutabilis (Verrill) 1893
Discocelis grisea Pearse 1938

Oval or oboval, anterior end broadest, band of marginal eyes around the anterior body half, cerebral and tentacular eyes in 4 conspicuous clusters, color gray to yellowish brown, with or without brown speckles, to 18 mm. long, 5 mm. wide, pharynx central, elongate, moderately ruffled, digestive branches not anastomosed, penis and male antrum with numerous small prostatic apparatuses and a

semicircle of about 7 pockets around the male antrum, each containing 1-3 large prostatic apparatuses (see Hyman, 1939b, 1940). Distribution, Massachusetts to Florida, rare in the northern part of the range; active, changeable, among shells and algae, also swims at the surface. Figures in Pearse, 1938, fig. 22, and Hyman, 1940.

No specimens of Verrill labelled *Discocelis mutabilis* have as yet been discovered but my study of Pearse's specimens of *Discocelis "grisea"* failed to show any difference between these and Verrill's description and figures of *D. mutabilis* except color. Sections showed that the animal does not belong to the genus *Discocelis* and hence I created for it a new genus *Coronadena* (Hyman, 1939b).

Family Plehniidae

Craspedommata of oval or elliptical form and thick firm consistency; marginal band of eyes limited to anterior half; cerebral and tentacular eye clusters present, inconspicuous, of small eyes; tentacles wanting; male apparatus with typical prostate, without numerous small prostatic apparatuses in its walls; vasa deferentia with muscular walls (termed accessory seminal vesicles). One species in region.

Discocelides ellipsoides (Girard) 1854

Syn. *Leptoplana ellipsoides* Girard 1854
Leptoplana folium Verrill 1873
Trigonoporus folium (Verrill) 1893
Trigonoporus dendriticus Verrill 1893

Elliptical, anterior end pointed, posterior rounded, thick, firm, to 20-25 mm. long, 10-15 mm. wide, marginal band of eyes limited to anterior third, tentacular and cerebral eye clusters of small eyes, inconspicuous, cerebral group loose, elongated, following large nerve trunks anteriorly, color flesh, yellowish, or yellowish brown, reddish or pink over brain and main nerve trunks, pharynx central, small, with about 5 lobes on each side, intestine extremely dendritic, anastomosed into a network, male apparatus with a large free prostatic vesicle; Lang's vesicle elongated. Long Island Sound northward, uncommon, littoral to deep waters, active, restless, can swim. Figure in Hyman, 1940.

The Discocelidae cannot be distinguished from the Plehniidae except by study of serial sections of the copulatory apparatus; but *Discocelides ellipsoides* can be distinguished from *Coronadena mutabilis* by its pointed anterior end, shorter length of the marginal band of eyes, and inconspicuous clusters of small eyes.

The synonymy given above has been worked out by careful study of available specimens, one labelled by Verrill himself, and comparison of the original descriptions, and is believed to be correct.

Family Stylochidae

Craspedommata with more or less elongate oval to oblong bodies of thick opaque texture; with a pair of nuchal tentacles containing eyes; cerebral and often frontal eyes also present; pharynx richly

ruffled, often large; copulatory complex in posterior body fourth; prostate free; with true or accessory seminal vesicles. All our Atlantic coast species so far known, belong to the genus *Stylochus,* distinguished by its simple vagina without a Lang's vesicle.

Stylochus ellipticus (Girard) 1850

Syn. *Planocera elliptica* Girard 1850
Planocera nebulosa Girard 1853
Stylochopsis littoralis Verrill 1873
Stylochus littoralis (Verrill) Lang 1884
Eustylochus ellipticus (Girard) Verrill 1892
Eustylochus meridionalis Pearse 1938

Oval, flat, thick, to 20-25 mm. long, with a pair of elongate, pointed tentacles, marginal band along anterior third to half of body, in some specimens a few small scattered eyes occur along the posterior half of the margin, tentacles filled with eyes, cerebral and frontal eyes very variable, most often in four groups of two to several eyes each, but may be more numerous and scattered extending to the marginal band, color very variable, cream, yellow, reddish-brown, brown, olive, or gray, often veined and reticulated or finely spotted with a lighter or darker shade, with a light middorsal stripe, usually more noticeable towards the posterior end, copulatory apparatus very close to posterior margin. Texas to Prince Edward Island, very common, littoral, among oysters, shells, and barnacles, on pilings, under rocks. Figure in Hyman, 1939a.

Stylochus zebra (Verrill) 1882

Syn. *Stylochopsis zebra* Verrill 1882

Oblong or oblong-elliptical, thick, firm, rounded at ends, to 30-40 mm. long, 10-12 mm. wide, tentacles short, rounded, filled with eyes, marginal band of eyes completely encircling the margin, cerebral eyes in paired elongated clusters which merge with marginal band by way of frontal eyes, color conspicuous of alternating flesh and chocolate cross bars, bars V-shaped at anterior and posterior ends. Massachusetts to North Carolina, sluggish, inactive, found on wharves and pilings, and most often in shells, especially those containing hermit crabs. Figure in Verrill, 1892.

Section Schemmatomata

Acotylea without marginal eyes; eyes in cerebral and tentacular clusters, well back from anterior margin.

Family Leptoplanidae

Schemmatomata with more or less elongate bodies, often expanded anteriorly; tentacles absent or present (absent in all Atlantic coast leptoplanids); prostate when present always interpolated; uteri confluent anterior to the pharynx; nearly always some shade of brown above, pale below. Two known species in region in question.

Notoplana atomata (O. F. Müller) 1776
Syn. *? Polycelis variabilis* Girard 1850
Leptoplana variabilis (Girard) Verrill 1892
Leptoplana virilis Verrill 1892
Leptoplana ellipsoides (Girard) Verrill 1893
(not *Leptoplana ellipsoides* Girard 1854)

Elongated obovate or oblanceolate, broadest across anterior region, diminishing to blunt posterior end, to 28 mm. long, with four conspicous eye clusters, tentacles absent, various shades of brown above, more or less flecked and streaky, prostatic vesicle spherical, penis with a bow-shaped stylet lying in the male canal, Lang's vesicle long and slender. Massachusetts northward to Scandinavia, common, littoral, sluggish, under stones in tide pools, also on pilings and among algae. This is the most common polyclad of our North Atlantic coast from Massachusetts northward. In the past it was usually called *Leptoplana variabilis*. It is easily recognized by the arched penis stylet, seen by putting pressure on the living animal. Figure in Hyman, 1939a.

Euplana gracilis (Girard) 1850
Syn. *Prosthiostomum gracile* Girard 1850
Prosthiostomum gracile Girard, Verrill 1893
Euplana gracilis (Girard) 1893
Conjuguterus parvus Pearse 1938

Small, slender, elongate, planaria-like in appearance, anterior end rounded to obtuse, 8-12 mm. long, without tentacles, eyes very few, about 6 on each side, of which last 2 represent the tentacular groups, irregular row of 4 anterior to these are the cerebral groups, yellowish or brownish gray, somewhat speckled, pharynx small, slightly ruffled, anterior to middle, no prostatic vesicle, penis papilla, or Lang's vesicle. Florida to Prince Edward Island, common, active, on pilings among mats of seaweeds, hydroids, etc., also littoral among old shells. Girard's species *"Prosthiostomum" gracile* is not a *Prosthiostomum* at all, hence, Pearse and Walker's figure 15 must be wrong. (Figure in Hyman, 1939a.)

Family Hoploplanidae

Schemmatommata of oval form, usually with tentacles; penis consists of a stylet fastened directly to the prostatic vesicle; true seminal vesicle absent, instead there are strongly developed accessory seminal vesicles; Lang's vesicle absent. One species in region.

Hoploplana inquilina (Wheeler) 1894
Syn. *Planocera inquilina* Wheeler 1894

Oval, flat, 6 mm. long by 4 mm. wide, with pointed conical tentacles, cluster of tentacular eyes in and around tentacle bases, loose cerebral clusters, pale, translucent, with a reticulum of granules white by reflected, black by transmitted light, pharynx broad, with

wide ruffles, penis stylet small, pointed, straight, fastened directly to round prostatic vesicle. Recorded only from Woods Hole, Massachusetts, sluggish, creeping slowly, commensal in the mantle cavity of the snail *Busycon*. Figure in Wheeler, 1894.

Family Planoceridae

Schemmatomata with a cirrus instead of a penis; cirrus sac lined by cuticular spines, hooks or ridges reversible to the outside, or a veriform cuticularized papilla may be present; often with tentacles; uteri not confluent anterior to the pharynx. One species in region.

Gnesioceros floridana (Pearse) 1938
Syn. *Imogine oculifera* (Girard) Verrill 1892
(not *Imogine oculifera* Girard 1853)
Stylochoplana floridana Pearse 1938
Stylochoplana oculifera (Girard) Pearse and Walker 1939
Gnesioceros verrilli Hyman 1939

Oblanceolate, anteriorly expanded, tapering to a pointed posterior end, small, 6-8 mm. long, with pointed tentacles containing eyes, cerebral groups of eyes loose, extending before and behind the level of the tentacles, color translucent greenish, male apparatus consists of prostate with transverse chambers and conch-like cirrus both inclosed in same thick muscular sheath, cirrus armed with parallel toothed ridges, genital pores separate, Lang's vesicle crescentic. Florida to Massachusetts, more common southward, among seaweeds, quick, active, may swim. Figure in Hyman, 1939a.

This species, erroneously identified by Verrill as *Imogine oculifera* (which really belongs to the genus *Stylochus*), was renamed by me *Gnesioceros verrilli* (Hyman, 1939a); however, before my article appeared in print, Pearse had published the same species under the name *Stylochoplana floridana* (Pearse, 1938). Although Pearse had no understanding of the correct status of the species, the law of priority necessitates that his specific name be adopted and mine fall into synonymy.

Suborder Cotylea

Polyclads with a sucker behind the female genital pore; tentacles when present of the marginal type; a pair of eye clusters on the anterior margin, extending on the tentacles when present; or eyes in a band along the anterior margin; pharynx anterior, ruffled, bell-shaped, or tubular; uteri usually behind the female genital pore; prostate when present always free; Lang's vesicle absent. One species in region.

Family Euryleptidae

Cotylea with pointed marginal tentacles, or tentacles rudimentary or lacking; pharynx short, tubular or bell-shaped, anteriorly located, directed forward; male apparatus behind or beneath the pharynx; penis with stylet and free prostate; uteri form a pair of large un-

branded canals alongside the main gut; uterine glands few, generally but two, or lacking.

Eurylepta maculosa Verrill 1893

Elliptical or oblong, thin, changeable, with thin undulated margin, 10-12 mm. long, tentacles long, bluntly pointed, with eyes on the lower halves of their anterior faces, mottled brown or purplish brown on a pale yellowish or flesh ground, main gut with about 3 pairs of lateral branches. Vicinity of Woods Hole, rare, on piles, in mud, among algae. Figure in Verrill 1893.

A good specimen of this species, which has not been seen since Verrill's day, is needed before its anatomy can be thoroughly understood; it is not certain that it really belongs in the genus *Eurylepta*. It is easily known from all other polyclads of the region in question by the pair of tentacles at the anterior margin.

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Other references will be found in the foregoing papers.

SOME FURTHER EXPERIMENTS ON THE RELATION OF THE EXTERNAL ENVIRONMENT TO THE SPERMATOGENETIC CYCLE OF *FUNDULUS HETEROCLITUS*

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It has been shown (Burger 1939a, Matthews 1939) that spermatogenesis in *Fundulus* can be precociously induced by a rise in temperature. It is of interest to examine whether or not the testicular involution which follows the breeding season can be effected by temperature. Previously, it was demonstrated (Burger 1939) that light plays no role in gonadal involution.

Fundulus were captured on June 27 and confined to laboratory aquaria. The fish at this time are at the peak of sexual development.