literation of the spiracle, and the fusion of the palato-quadrate with the cranium. Dermal margin of the hyoidean arch develops early and partly encloses the hinder gill slits. Long external gill-filaments (arising as in shark from the posterior margin of the gill bar) are now present. Tail becomes exceedingly long and attenuated. A highly specialized character is the mode of absorption of yolk material during late embryonic stages. The extra-embryonic blastoderm surrounds a lobe of the yolk: the latter comes to be reduced to independent lobes, and later to a milky fluid which is doubtless appropriated by the embryo by means of its external gills. These now present greatly dilated blood nodes, red in color. The late embryo lies in an opaque nutritive fluid, its relatively small and irregularly shaped yolk sac represents the small lobe early separated from the yolk.

On the occurrence of amphioxus at Bermuda: C. L. Bristol and F. W. Carpenter.

Amphioxus was first found in Bermuda by Professor G. Brown Goode in 1877, but no specimens have ever been studied from the lot then collected. In the season of 1897, the Second New York University Expedition dredged for them unsuccessfully, but in the next season specimens were secured by Professor Verrill in April, and again in June by the Third New York University Expedition at the locality described by Goode at the Flatts Bridge. In addition to this locality, the New York University party found them near Trunk Island in Harrington Sound. Specimens were sent to Professor E. A. Andrews, who reports that they promise to prove *Branchiostoma caribaeum.*

Budding in Cassiopea: R. P. Bigelow.

In the course of an extended study of the development of *Cassiopea xaymacana*, a rhizostomatous medusa obtained in Jamaica, the author found it possible to draw an interesting comparison between the process of budding and strobilization. The buds are formed one at a time on the lower part of the calyx of the scyphistoma. The bud is an evagination of the body wall consisting of three layers—ectoderm, mesoglœa, and endoderm; and in the mesoglœa are embedded four longitudinal muscles which are formed by outgrowths from the adjacent longitudinal muscles of the present.

In the formation of the strobila, the greater part of the scyphistoma is converted into the medusa disc, while the basal polyp is a comparatively small and simple appendage serving mainly for support. This, like the bud, consists of a simple sack with a wall of three layers—ectoderm, mesoglœa and endoderm, and in the mesoglœa there are four longitudinal muscles. Just before the separation of the medusa the basal polyp forms eight tentacles, and a ridge of ectoderm grows out in a circle surrounding the isthmus. When medusa is set free, this ridge enlarges to form a proboscis, more tentacles are developed, and very soon the basal polyp cannot be distinguished from an ordinary scyphistoma developed from a bud.

Before the bud is set free its proximal and distal ends become differentiated structurally, so that it is easy to distinguish them. Soon after becoming free the planula-like bud becomes attached to some solid support by its distal end, and the mouth is formed at the proximal end and becomes surrounded with a crown of tentacles, the orientation is just the opposite of what one would expect and corresponds with what Claus and Goette found to occur in Cotylorhiza.

So the bud and the basal polyp not only correspond in general structure, but in both it is the proximal end that forms the mouth and the distal end the foot. Their orientation is the same, and while attached to the calyx, their central axes meet as an acute angle, the distal ends being directed downward in both cases. Thus there is seen to be a striking analogy, if not homology, between bud and basal polyp. The formation of supernumerary tentacles and other structures is common in this species, so it may be possible to regard the bud as a supernumerary and precociously developed basal polyp.

Notes on the anatomy of Acmæa testudinalis, Müller: M. A. WILCOX.

The following points were made:

1. There is probable, though not conclusive evidence in favor of a winter migration to deeper water.

2. The inner face of the mantle is uniformly clothed with cilia borne, not continuously, but in patches some 20–30 μ apart.

3. Subepidermal glands are situated at the mantle margin. Unlike those described by Haller in a similar position, they are unicellular. Whether they contribute to the formation of the shell is uncertain.

4. The inner face of the mantle also bears subepidermal glands which are scattered and are probably unicellular mucous glands.

5. Animals killed by agents which produce strong contraction, exhibit folds of the mantle which lie parallel to the foot and contain blood spaces. These seem entirely similar to those described by Haller in *Lottia (acmæa) punctata* but in *A. testudinalis* are artefacts.

6. Both mantle tentacles and those borne on the head are richly provided with sense cells of Flemming.

7. The cephalic tentacles have each a large axial cavity which communicates with the cavity of the head. The wall surrounding the tentacular cavity consists of connective tissue in which longitudinal muscle fibres are imbedded and the tentacle, therefore, is intermediate between the ordinary solid prosobranch tentacle and the invaginable tentacle of the stylommatophora.

8. The chief nephridium closely resembles that of Patella, except that the portion which lies on the left side in *A. testudinalis* extends forward to the pericardium and probably communicates with it. The greater portion of this nephridium corresponds to what Haller describes as part of a coelom.

Locomotion in Solenomya and its relatives. G. A. DREW.

These forms burrow rapidly in mud or sand. The extremity of the foot is provided with two muscular flaps that may lie side by side or be spread apart. When the flaps lie side by side the extremity of the foot is wedge shaped, and the foot can easily be thrust into mud or sand. When the flaps are spread apart they form a very effective anchor. With the foot thrust into the mud and the flaps spread, a contraction of the retractor foot-muscles results in drawing the shell into the mud up to the position of the spread flaps. From this position another thrust can be made.

Beside burrowing, Solenomya swims quite rapidly. The thick elastic cuticle extends past the calcareous portion of the shell, along its ventral borders to a distance fully equal to one-fourth the entire width of the shell. The margins of the mantle have united ventrally, leaving a small posterior opening through which water can be forced, and a larger anterior opening through which the foot can be protruded. The region of the united margins of the mantle is occupied by a rather broad longitudinal muscle that spreads out around the anterior and posterior openings to form sphincters. The radial pallial muscles are also strongly developed. These extend from the calcareous margins of the shell to the free margins of the cuticle.

When the foot is protruded nearly to its full extent, and the pallial muscles are relaxed, the anterior opening is much larger than the foot, and through it water can