Buds formed on stolons which are vascular outgrowths from the pos­terior end of the body, containing prolongations from the ectoderm, mesoderm, and endoderm of the ascidiozooid. Branchial sac not folded ; internal longitudinal bars usually absent; stigmata straight; tentacles simple. This family contains three genera : *Ecteinascidia* (Herdman), with internal longitudinal bars in branchial sac ; *Clavel­ina* (Savigny), with intestine extending behind branchial sac ; and *Perophora* (Wiegmann), with intestine alongside branchial sac.

Family II.—Ascidiidæ. Solitary fixed Ascidians with gelatinous test ; branchial aperture usually eight-lobed, atrial aperture usually six - lobed. Branchial sac not folded ; internal longitudinal bars usually present ; stigmata straight or curved ; tentacles simple. This family is divided into three sections :—

Sub-family 1.—Hypobythinæ. Branchial sac with no internal longitudinal bars. One genus, *Hypobythius* (Moseley).

Sub-family 2.—Ascidinæ. Stigmata straight. Many genera, of which the following are the more important :—*Ciona* (Fleming), dorsal languets present ; *Ascidia* (Linnæus, = *Phallusia,* Savigny), dorsal lamina present (see figs. 1 to 10) ; *Rhodosoma* (Ehrenberg), anterior part of test modified to form operculum ; *Abyssascidia* (Herdman), intestine on right side of branchial sac.

Sub-family 3.—Corellinæ. Stigmata curved. Three genera :— *Corella* (Alder and Hancock), test gelatinous, body sessile ; *Coryn- ascidia* (Herdman), test gelatinous, body pedunculated; *Chelyo­soma* (Brod. and Sow.), test modified into horny plates.

Family III.—Cynthiidæ. Solitary fixed Ascidians, usually with leathery test ; branchial and atrial apertures usually both four-lobed. Branchial sac longitudinally folded ; stigmata straight ; tentacles simple or compound. This family is divided into three sections :—

Sub-family 1.—Styelinæ, not more than four folds on each side of branchial sac ; tentacles simple. The more important genera are *—Styela* (Macleay), stigmata normal, and *Bathyoncus* (Herdman), stigmata absent or modified.

Sub-family 2.—Cynthinæ, more than eight folds in branchial sac; tentacles compound; body sessile. The chief genus is *Cynthia* (Sa­vigny), with a large number of species.

Sub-family 3. — Bol­teninæ, more than eight folds in branchial sac ; tentacles compound ; body pedunculated (fig.

18, A). The chief genera are—*Boltenia* (Savigny), branchial aperture four- lobed, stigmata normal ; and *Culeohus* (Herd- man), branchial aper­ture with less than four lobes, stigmata absent or modified (fig. 18, B). This last is a deep-sea genus discovered by the “Challenger” expedition (see z7).

Family IV.—Molgulidæ. Solitary Ascidians, sometimes not fixed ; branchial aperture six-lobed, atrial four-lobed. Test usually incrusted with sand. Branchial sac longitudinally folded ; stigmata more or less curved, usually arranged in spirals; tentacles compound. The chief genera are—*Molgula* (Forbes), with distinct folds in the branchial sac, and *Eugyra* (Ald. and Hanc.), with no distinct folds, but merely broad internal longitudinal bars in the branchial sac. In some of the *Molgulidæ* (genus *Anurella,* Lacaze-Duthiers, *20)* the embryo does not become converted into a tailed larva, the development being direct, without metamorphosis. The embryo when hatched assumes gradually the adult structure, and never shows the features characteristic of larval Ascidians, such as the urochord and the median sense-organs.

Sub-order 2. —Ascidiæ Compositæ.

Fixed Ascidians which reproduce by gemmation, so as to form colonies in which the ascidiozooids are buried in a common invest­ing mass and have no separate tests. This is probably a somewhat artificial assemblage formed of two or three groups of Ascidians which produce colonies in which the ascidiozooids are so intimately united that they possess a common test or investing mass. This is the only character which distinguishes them from the *Clavelinidæ,* but the property of reproducing by gemmation separates them from the rest of the *Ascidiæ Simplices.* The *Ascidiæ Compositæ* may be divided into the following families :—

Family I.—Distomidæ. Ascidiozooids divided into two regions, thorax and abdomen ; testes numerous ; vas deferens not spirally coiled. The chief genera are—*Distoma* (Gaertner) ; *Distaplia* (Della Valle) ; *Colella* (Herdman), forming a pedunculated colony (see fig.

19, A) in which the ascidiozooids develop incubatory pouches, connected with the peribranchial cavity, in which the embryos undergo their development (z7) ; and *Chondrostachys* (Macdonald).

Family II.—Cœlocormidæ. Colony not fixed, having a large axial cavity with a terminal aperture. Branchial apertures five-lobed. This includes one species, *Cœlocormus huxleyi* (Herdman), which is a transition form between the ordinary Compound Ascidians (*e.g., Distomidæ)* and the *Ascidiæ Salpiformes (Pyrosoma).*

Family III.—Didemnidæ. Colony usually thin and incrusting Test containing stel­late calcareous spi­cules. Testis single, large ; vas deferens spirally coiled. The chief genera are—*Di­demnum* (Savigny), in which the colony is thick and fleshy and there are only three rows of stig­mata on each side of the branchial sac ; and *Leptoclinum* (Milne-Edwards), in which the colony is thin and incrusting (fig. 19, B) and there are four rows of stigmata on each side of the branchial sac.

Family IV.—Diplosomidæ. Test reduced in amount, rarely con­taining spicules. Vas deferens not spirally coiled. In *Diplosoma* (Macdonald), the most important genus, the larva is gemmiparous.

Family V.—Polyclinidæ. Ascidiozooids divided into three regions,—thorax, abdomen, and post-abdomen. Testes numerous ; vas deferens not spirally coiled. The chief genera are—*Pharyngo- dictyon* (Herdman), with stigmata absent or modified, containing one species, *Ph. mirabile* (fig. 19, C), the only Compound Ascidian known from a depth of 1000 fathoms ; *Polyclinum* (Savigny), with a smooth-walled stomach ; *Aplidium* (Savigny), with the stomach wall longitudinally folded ; and *Amaroucium* (Milne-Edwards), in which the ascidiozooid has a long post-abdomen and a large atrial languet.

Family VI.—Botryllidæ. Ascidiozooids having the intestine and reproductive organs alongside the branchial sac. Dorsal lamina present ; internal longitudinal bars present in branchial sac. The chief genera are—*Botryllus* (Gaertn. and Pall.), with simple stellate systems (fig. 19, D), and *Botrylloides* (Milne-Edwards), with elongated or ramified systems.

Family VII.—Polystyelidæ. Ascidiozooids not grouped in systems. Branchial and atrial apertures four-lobed. Branchial sac may be folded ; internal longitudinal bars present. The chief genera are—*Thylacium* (Carus), with ascidiozooids projecting above general surface of colony ; *Goodsiria* (Cun­ningham), with ascidiozooids completely imbedded in investing mass ; and *Chorizo- cormus* (Herdman), with ascidiozooids united in little groups which are connected by stolons. The last genus contains one species, *Ch. reticulatus,* a transition form between the other *Polystyelidæ* and the *Styelinæ* amongst Simple Ascidians.

The methods of reproduction by gemma­tion differ in their details in the various groups of Compound Ascidians ; but in all cases the process is essentially a giving off from the parent body of groups of cells re­presenting the ectoderm, the mesoderm, and the endoderm, which develop into the corresponding layers of the bud. The first ascidiozooid of the colony produced by the tailed larva does not form sexual repro­ductive organs, but reproduces by gemma­tion so as to make a colony. Thus there is alternation of generations in the life- history. In the most completely formed colonies (*e.g., Botryllus)* the ascidiozooids are arranged in groups (systems or coeno­bii), and in each system are placed with their atrial apertures towards one another, and all communicating with a common cloacal cavity which opens to the exterior in the centre of the system (fig. 19 D).

Sub-order 3.—Ascidiæ Salpiformes.

Free-swimming pelagic colonies having the form of a hollow cylinder closed at one end. The ascidiozooids forming the colony are imbedded in the common test in such a manner that the branchial apertures open on the outer surface and the atrial apertures on the inner surface next to the central cavity of the colony. The ascidiozooids are produced by gemmation from a rudimentary larva (the cyathozooid) developed sexually.