

(p. 950, § 182). The Stephanida are the most archaic family among the *Stephoidea* (p. 937, Pl. 81), perhaps indeed among all the *NASSELLARIA* (§ 184); in them the sagittal ring and its processes alone constitute the skeleton; secondary rings and meshes are wanting. Two diverging families, the Semantida and Coronida, have been developed from the Stephanida, and from one of them the family Tympanida has arisen.

The Semantida (p. 953, Pl. 92) develop a horizontal basal ring at the oral side of the vertical sagittal ring; the basal meshes or lattice gates, which remain between the former and the latter, are the important cortinar pores (one pair jugular, one pair cardinal, p. 954); they usually appear inherited in the cortinar septum of the *Cyrtellaria*. In the Coronida (p. 967, Pls. 82, 94) a second vertical ring (the frontal ring) appears in addition to the sagittal ring; it lies in the frontal plane at right angles to the latter. Finally the Tympanida (p. 987, Pls. 93, 94) have probably arisen from the Semantida by the formation of a second horizontal ring (mitral ring) parallel to the basal and attached to the upper portion of the sagittal ring.

188. *Genealogical Tree of the Spyroidea*.—The extensive order *Spyroidea* is of especial interest in connection with the phylogeny of the *NASSELLARIA*, since all its members show two well-developed skeletal elements in combination, the sagittal ring of the *Stephoidea* and the latticed cephalis of the *Cyrtoidea*; the majority possess also the basal tripod of the *Plectoidea* (or a radial skeleton derived from it). Hence there is a possibility of deriving the stem-forms of the *Spyroidea* from each of these three groups. The four families of this order exhibit similar relationships to those of the four families of *Cyrtoidea*; the common stem-group is the family *Zygospyrida*; from this the *Tholospyrida* have arisen by the development of a galea on the apical pole, the *Phormospyrida* by the addition of a thorax on the basal pole. The *Androsphyrida* may be derived either from the *Tholospyrida* by the formation of a basal thorax, or from the *Phormospyrida* by the development of an apical galea. Some groups, however, such as the peculiar *Nephrosphyrida* (Pl. 90) have probably been developed directly from the *Stephoidea*.

189. *Genealogical Tree of the Botryodea*.—The peculiar order *Botryodea* (p. 1103), which is both difficult to investigate and insufficiently known, presents great phylogenetic difficulties both as to its ascent and descent. Probably the different genera of this order have been polyphyletically developed from different groups of *Cyrtoidea* (perhaps also to some extent of *Spyroidea*) by the formation of lobes in the cephalis. The three families of *Botryodea* are related to each other in the same way as are the three first families of the *Cyrtoidea*. From the single-jointed *Cannobotryida* (corresponding to the *Monocyrtida*), the two-jointed *Lithobotryida* (corresponding to the *Dicyrtida*), may be derived by the development of a basal thorax, and from the latter the three-jointed *Pylobotryida* (like the *Tricyrtida*) by the addition of an abdomen. In the last two families the forms with an open basal mouth