The surface of the little visceral sac (the mantle consequently) is reflected above the opening of the shell, passes into the wall of the "episoma" closely attached to it (separated by a space in Pl. V. fig. 1), and evidently secreting (upon the median line) the "band of thickening" (Pl. II. fig. 7, *b*). The mantle thus forms a shell cavity, closed on all sides except at two opposite points, the dorsal and ventral openings of the shell, by which the portions of the last whorl of the shell make a free projection outside.

These shell openings, in short, form an absolutely natural disposition, although in the Challenger specimen, where the integuments of this region were considerably altered, the margins of the openings appeared to be fixed and to have thus sent short irregularly-cut prolongations over the shell (Pl. I. figs. 1, 3); in *Spirula australis* (Pl. II. figs. 1, 2), and in *Spirula reticulata* (Fig. C in the text), this margin is perfectly complete and uniform, and there is no portion of the integument, however thin this may be, which passes over the shell, contrary to the opinion of Steenstrup[1] and Owen, according to whom the periostracum (shell epidermis) was *continuous with* the epithelium of the margin of the pallial openings.[2] As one might expect, this last assertion is absolutely incorrect. This periostracum is continuous under the mantle over the whole surface of the internal portions of the shell, and it is in no way a cellular tissue.

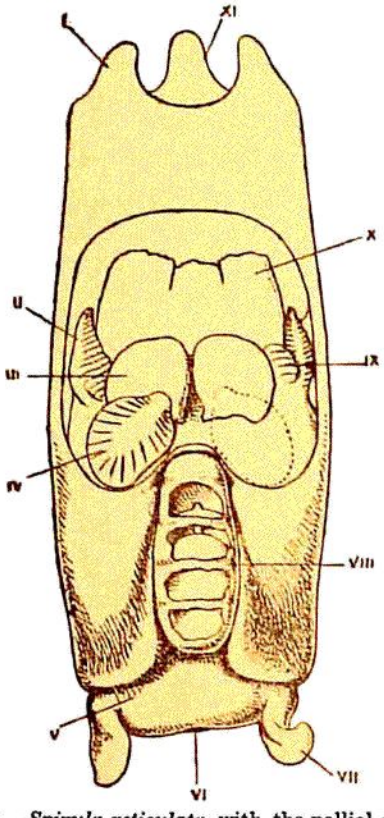


FIG. C.—*Spirula reticulata*, with the pallial cavity laid open, ventral view; × 4. i, ventro-lateral projection of the edge of the mantle; ii, gill; iii, accessory nidamental gland; iv, nidamental gland; v, terminal disk; vi, aboral fossa; vii, left fin; viii, external ventral part of the shell; ix, oviduct; x, retractor muscle of the infundibulum; xi, dorsal projection of the mantle edge.

In front and upon the sides, the wall of the shell sac is formed by the thin "peritoneal" membrane, which constitutes the external envelope of the viscero-pericardial cavity (completely separated from the shell sac); posteriorly it is formed by the terminal disk. Internally the shell sac is limited by the little mantle, properly so-called (see above), and by its continuation, the siphuncle (Pl. V. fig. 1, *sphm.*), extending as far as the first chamber.

Upon the wall of the shell sac are inserted laterally: in front, the retractor muscles of the branchiæ (which on parting from the branchia are at first transverse, then directed posteriorly); behind, the muscular bundles of the fins.

*b. Terminal Disk.*—The terminal disk is fleshy and covers the most aboral parts of the shell with a thick layer of tissue limited all round by a superficial furrow more or less

[1] Steenstrup, *op. cit.*, p. 227: "Shell distinctly covered dorsally and ventrally, where the skin grew thin above it."

[2] Owen, *Ann. Mag. Nat. Hist.*, ser. 5, vol. iii. p. 3.