

OBSERVATIONS ON SPIRULA.

I. EXTERNAL CONFORMATION AND TEGUMENTS.

The body of *Spirula* is elongated, cylindrical, truncated posteriorly. The posterior extremity is constituted by a "terminal disk," which is less distinct in *Spirula peronii* (Pl. I. figs. 1-4) than in *Spirula australis* (Pl. II. figs. 1-3) and in *Spirula reticulata* (Figs. C, J, and N in the text); it carries two small fins, parallel to the median sagittal plane, between which is an orifice leading into a little fossa. In the posterior half there are, both dorsally and ventrally, two antero-posterior oval openings through which the last whorl of the shell very slightly projects. This "body" corresponds to the visceral sac, covered by the mantle, of *Nautilus* and of the Gastropods ("episoma," Huxley); the cephalo-pedal mass ("prosoma" or cephalopodium, Huxley) is united to the body by the "mesosoma" (Huxley), that is to say, by the nuchal region and the funnel, the latter (epipodium) belonging morphologically to the foot.

These different parts: head, foot (arms), funnel, mantle, &c., must be separately examined.

1. *Head*.—In the Challenger specimen this part was retracted into the pallial cavity (Pl. I. figs. 1, 2, 3) and a little distorted (Pl. I. figs. 5, 6). The "Blake" specimen (Pl. II. fig. 1) had also the head slightly twisted. This asymmetry is not normal, however, and has not been observed in other specimens;¹ it is apparently a deformation due to contraction. The head in its general conformation, like that of other Decapods, is characterised (in the Challenger and "Blake" specimens) by its rather considerable width, especially in the posterior part; it is more developed laterally than dorso-ventrally. The eyes are placed laterally, and behind them, but more ventrally, are found the olfactory organs (see further on for the conformation of these organs).

2. *Arms*.—As in all the Decapods, there are eight sessile arms, which are in *Spirula* rather short, and two long pedunculated or tentacular arms.

a. Sessile Arms.—The eight short arms are perceptibly equal in length (Pl. I. figs. 1-3); their aboral or external surface is rounded, except that there is a median longitudinal ridge. The internal face is flattened so as to form a surface for the acetabula, extending from the base to the summit of each arm; this surface is broad and bounded by a curved contour at the basal extremity and narrows gradually towards the summit. The bases

¹ For example, the individual studied by Owen in 1879.