

VIII. ETHOLOGY OR BIONOMICS.

The conditions of existence of *Spirula* are almost entirely unknown. We know that the shells of this genus are thrown in very great numbers upon certain shores, and that, not being able to fall to the bottom on account of their lightness, they are often carried by currents to considerable distances. It is the same with the animal, when *dead*; it is carried to the surface by its shell playing the *role* of float (for example: Péron's specimen, those of the "Recherche" [Robert, 1856], and those of Professor Giard), or it may even be carried as far as some sea-shore (for example: Owen's specimen [1879] and that in the Sydney Museum). But never has a *Spirula* been collected alive, at the surface nor even near the surface.¹

Only two individuals have been dredged: one in 360 fathoms by the Challenger and one in 950 fathoms by the "Blake," and these individuals were dead.

Spirula then is not a pelagic animal; it must be an inhabitant of rather deep water. In fact if we examine the various known localities where *Spirula* has been met with, and those where its shell is thrown up in great quantities, we find that they belong only to a few principal centres:—

1. Between Australia and New Zealand.²
2. Banda Sea.³
3. West Indies.⁴
4. N. W. of Africa.⁵

However, in each of these centres, or very near them, is found, to use the usual term in physical geography, a "deep" or oceanic surface of relatively small extent, with a very rapidly increasing depth up to 2500, and even 4000, fathoms.⁶ It may therefore be predicted with sufficient certainty that, to find perfect specimens of *Spirula*, it is necessary to search in deep water in one or other of the deeps here indicated.

¹ Gray (On the animal of *Spirula*, *Ann. Mag. Nat. Hist.*, ser. 1, vol. xv. p. 259) says:—"I am informed by M. Clausen that he had several specimens of this animal alive, and kept them some time in a vessel filled with sea water, and that they had the power of ascending and descending at pleasure." But from such an indefinite indication we cannot have any certainty that it was indeed *Spirula*, no other mention having been made by M. Clausen of such an important fact.

² Specimens of Péron, of the Sydney Museum, and of Owen (1879).

³ Fragments of Rumphius (Amboina), of Owen (Timor), and Challenger specimen.

⁴ "Blake" specimen.

⁵ Specimens of Cranch, of Robert, of Professor Giard, and another mutilated specimen which, Mr Craven, F.L.S., tells me, was taken between Madeira and the Canaries.

⁶ See especially the large chart (planisphere) accompanying the Narrative of the Cruise of H.M.S. Challenger.