

also; the warts and cirri certainly vary according to the mode of preservation, but they are rarely so masked as not to be perceptible on careful examination. The matter is still open to question, however, and any one who can readily obtain numbers of fresh specimens would do a good work by killing and preserving them in different ways and reporting upon the variations thus produced in their surface markings.

A character which has been much used by some authors, Gray for instance, is the fact that a certain number of the proximal cups are often arranged in a single series. This, I feel convinced, is of very little importance; the statement that the suckers in the genus *Octopus* are in two series is not, strictly speaking, correct, they are placed in a zigzag so close that they often appear to form a succession of pairs, but when the arm is extended (bent away from the mouth) the proximal portion of the zigzag is stretched out and the suckers fall into a more or less nearly straight line, on the other hand, when the arm is flexed (towards the mouth) the zigzag closes up and the two series reappear. The presence or absence of certain large suckers on the lateral arms, used by d'Orbigny, and by Gray and Tryon following him, for specific diagnosis, has long since been shown by Steenstrup to be merely a sexual character.

To sum up, then, I have paid some attention to the form and proportions of the body, not much to variations in the lengths of the arms (unless these were considerable), some to the colour, and a good deal to the nature of the surface of the body.

Any peculiarities that presented themselves in the suckers have, of course been noted, and the same is the case with the hectocotyliised arm whenever this was present.

Of this last structure I have observed what seem to be three fairly distinct types:—

1. That found in *Octopus vulgaris*, *Octopus marmoratus* (Pl. VI. figs. 2, 3), &c., where the modified extremity is minute in relation to the arm; it is conical, or rather pyramidal, and has a narrow groove on the inner side.

2. The form seen in *Octopus levis* (Pl. II. fig. 2), *Octopus januarii* (Pl. VII. fig. 2), &c., which resembles the last in form, but is decidedly more bulky and conspicuous. It shows a tendency to develop transverse ridges on the interior of the spoon-shaped termination, and reaches its extreme form in *Octopus obesus*, Verrill.¹

3. The form which has only been found, so far as I am aware, in *Octopus punctatus*, Gabb. (see Pl. V. fig. 2). It is slender and very long in proportion to the arm, being nearly one-tenth of its total length in the Challenger specimen.

There is a temptation to break up the large genus *Octopus* into groups based upon characters derived from this organ, but I have been unable at present to ascertain that they are correlated with other distinctions between the different forms, and it may prove impossible to keep these three types separate when the structure of the hectocotyliised arm shall become known in a greater number of species than is at present the case.

¹ See Ceph. N. E. Amer., pl. xxxvi. fig. 4.