

character of an entire group of some extent, but is merely the result of a special adaptation of some restricted division.

I ought to mention at the outset that among the Gastropod Molluscs which have been cited as devoid of eyes, there are several which have not been subjected to sufficiently complete investigation, and which have been credited with blindness without special research, when the fact was that the eyes were only in some degree rudimentary. The conclusion was simply based on the observation that the head did not exhibit pigmented spots visible externally. Such are, for example,—

On the one hand, (A) a certain number of Bulloidea¹ (*Scaphander*, *Philine*, *Doridium*, &c.) and also Naticidæ, in which the eye really exists and is pigmented, but is covered by a tegumentary and muscular layer of some thickness. The latter is the result of adaptation to the burrowing habits of the animals. Through the tegumentary layer the above animals can still appreciate different degrees of light and darkness. It is possible that in certain forms of *Natica* the eye does not persist, but is altogether absent. (B) *Phyllirhoe*, reputed to be blind by von Siebold,² possesses pigmented eyes;³ but these are again covered by integument, and situated directly upon the nervous system, as is also the case (C) in certain Nudibranchs, such as *Doris*, *Eolis*, *Scyllæa*, *Tethys*, &c. In all these animals the rudimentary character of the eye consists solely in its being concealed below the integument, and in a moderate reduction of its dimensions.

On the other hand, (D) in *Guivillea*, and in certain other Gastropods afterwards mentioned, the eye still exists, but has been subjected to important modifications of structure, and has lost its pigment, as we have noted above.

I have unfortunately been unable, for lack of time, to corroborate, by personal examination, all the cited cases of Anisopleural Gastropods said to have no eyes, or to have visual organs atrophied in some way or other. It is therefore possible that in regard to some of the forms reputed to be "blind," some reservations may have to be made, as in the above cases.

Among these forms, perhaps the most astonishing are two large species of *Auricula* (*Auricula auris judæ* and *Auricula auris midæ*), for in these animals there does not seem to be any apparent reason for the atrophy of eyes; while in the cases to be mentioned below, the rudimentary nature or total disappearance of these organs is the result of a special and perfectly definite adaptation. It is evident that the primitive Anisopleura all possessed eyes, but that these organs may become rudimentary under the influence of special external conditions.

¹ Krohn, Fernere Beiträge zur Kenntniss des Schneckenauges, *Arch. f. Naturgesch.*, 1839, p. 335.

² Lehrbuch der vergleichenden Anatomie der Wirbellosen Thiere, p. 316.

³ Souleyet, Voyage de la Bonite, Zoologie, t. ii. p. 410.