

means of very narrow canals with the exterior, and that they occur in all the genera of Pycnogonids (at least in those I had then studied—*Nymphon*, *Pallene*, *Phoxichilidium*, and *Pycnogonum*). Moreover, I pointed out that as no respiratory organs are present in the Pycnogonids, respiration must necessarily be integumentary; it was my conviction in 1877, as it is still, after a minute investigation of the Challenger material, that the principal function of these canals is to serve for respiration. Contrary to this opinion, Dohrn asserts that the cavities, with the pore-canals, which he says, were rightly described by me, “zur Aufnahme von Hautdrüsen dienen.” To settle this question I investigated the structure of the integument of many species belonging to different genera. I studied it in *Nymphon hamatum*, *N. longicoxa*, *N. brachyrhynchus*, and *N. brevicaudatum*; in *Colossendeis leptorhynchus*, *C. gigas*, and *C. proboscidea*; in *Ascorhynchus glaber* and *A. orthorhynchus*; in *Pallene australiensis*; and in *Phoxichilidium patagonicum*, *P. pilosum*, and *P. insigne*.

Notwithstanding that my researches were especially directed to this point, I only once succeeded in observing the glands referred to by Dohrn, and although I grant it is possible that in some cases this may be owing to the condition of the animals, yet I feel sure that as a rule these glands are not present.

A short description of the integument may find a place here. It always consists of a subcuticular layer (epithelium), and of the chitinous cuticle. The subcuticular epithelium is of a protoplasmic nature, with nuclei imbedded in it¹ (Pl. XVI. figs. 1 and 17, *f*); the chitinous cuticle in the different species shows a very different thickness, and always presents a stratified appearance. It is never calcified, and, as a rule, is coloured yellow by picocarmine. Often, however, it shows two distinct laminæ; an internal very thick one, coloured violet by the picocarmine, and consisting of numerous alternately lighter and darker strata, and a comparatively thin external one, which assumes a yellow colour when treated with picocarmine (Pl. XVI. fig. 1). To strengthen the often extremely long and slender joints of the legs (especially the thighs and the two tibial joints), the chitinous cuticle is often furnished internally with one (*Ascorhynchus glaber*, Pl. XVI. fig. 9) or two (*Nymphon hamatum*, *Phoxichilidium insigne*) longitudinal ridges, which project into the interior of the leg. The form of these ridges on a transverse section is by no means always the same, as may be seen from the figures 6, 9, 11, 16, 17, and 18 on Pl. XVI. The septa of connective tissue, which in most genera divide the cavity of the joints of the leg (*Colossendeis*, *e.g.*, fig. 16, Pl. XVI.), often have a point of attachment in these ridges.

As a rule the chitinous cuticle of the Pycnogonids is perforated by two kinds of cavities, the one of an irregular conical shape, terminating externally in a narrow pore-canal; the other much narrower, and rather more cylindrically shaped, is filled

¹ The subcuticular epithelium of *Pallene australiensis*, Hoek, is richly furnished with a dark brown pigment. I did not observe this in any of the other species.