

its larger distribution in the Sycon having brought about the differentiation of the endodermic elements into flagellated and pavement-cells.

All this was stated on the supposition that it is principally pavement-cells which take in the nutritious particles. We have now to search into the corresponding physiological statements. The question has its own literature, but the statements of Lieberkühn,¹ Hæckel,² Carter,³ Keller,⁴ Metschnikoff,⁵ Vosmaer,⁶ and Krukenberg⁷ upon the subject are so very conflicting, that it must be regarded as very fortunate that science has recently been enriched by the new detailed observations of an investigator conscious of these contradictions. I speak of the beautifully illustrated memoir of Dr. v. Lendenfeld on the Aplysinidæ of the South Sea.⁸ His physiological statements are the result of numerous, and, as it seems, very carefully-made experiments. It is the more to be regretted that v. Lendenfeld was not quite impartial in the execution of the task. I do not mean to say that the experimenter was under the influence of the ideas on the morphology of the Sponge upheld by the late Prof. Balfour, but I think that had Dr. v. Lendenfeld begun his experiments in order to answer the question "Which cellular elements in the Sponges do carry on the nutritious process?" instead of "Are these elements of endodermic or ectodermic origin (*loc. cit.*, p. 251)?" he would have come to rather different conclusions. Dr. v. Lendenfeld suggests that—(1) all free surfaces of the Sponge are able to take in the food—a very important observation, for it reconciles in some measure the contradictory statements of former observers; and that (2) while the particles of carmine having entered the pavement-cells covering the subdermal cavities do pass into amœboid cells of the mesoderm in order to make their way from the superior part of the Sponge to the zone of the flagellated chambers, and to be afterwards pushed out by the flagellated cells, the flagellated cells neither retain the particles of carmine taken in from the water, nor deliver them to the mesodermic cells, but throw them out shortly after having imbibed them.

Dr. v. Lendenfeld tells us further, that the particles of carmine, taken in by the pavement-cells of the subdermal cavities, having been finally pushed out by the flagellated cells, appear altered in their form, presenting now rounded not sharp edges as they did before; and that this is not the case with the particles taken up by the flagellated cells. If now Dr. v. Lendenfeld comes to the conclusion that the flagellated cells are excretory organs of the sponge, I find this conclusion very natural and even plausible, although not quite beyond the reach of doubt, his experiments having been made with carmine and not with really nutritious material. At all events, however, I agree with him that the flagellated cells are not to be regarded as special organs concerned in the feeding of the sponge. For against this there are objections from a, so to speak, mechanical point of view.

¹ *Archiv f. Anat. u. Physiol.*, p. 385, 1857.

² *Ann. and Mag. Nat. Hist.*, ser. 5, vol. iv. p. 374, 1879.

³ *Ibid.*, Bd. xxxii. p. 371, 1879.

⁴ *Vergleichend-physiologische Studien*, Bd. i. p. 65, 1879.

⁵ *Kalkschwämme*, Bd. i. p. 372.

⁶ *Zeitschr. f. wiss. Zool.*, Bd. xxx. p. 570, 1878.

⁷ *Voorloopig berigt*, &c., p. 5.

⁸ *Zeitschr. f. wiss. Zool.*, Bd. xxviii. p. 234, 1883.