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I. Wissenschaftliche Mittheilungen.

1. The Segmentation of the ovum in terrestrial Isopods.

By J. Playfair McMurrich, Ann. Arbor, Mich.

eingeg. 11. Januar 1895.

For some time I have been engaged in a study of the early development of the Isopod Crustacea, and, during the past summer, completed a paper (to appear in the Journal of Morphology) containing the results of my observations on the segmentation and formation of the germ layers in a number of different species of Isopods. Since this paper left my hands Professor L. Roule has published an account of his observations on the early development of *Porcellio scaber*¹ giving in a more extended form and with figures the results previously indicated in preliminary notices in the Comptes Rendus. To these preliminary notices I have referred in my forthcoming paper, but as M. Roule has reiterated in his memoir statements so distinctly at variance with my observations on *Porcellio scaber* in this country, it seems fitting that attention should be called to certain of the discrepancies, especially since M. Roule's observations tend to perpetuate the, as I have good reason to believe, mistaken ideas of Bobretzky as to the existence of a telolecithal segmentation in terrestrial Isopods.

¹ L. Roule, Etudes sur le développement des Crustacés. Ann. des Sciences Nat. Zoologie, VII. Sér. T. XVIII. No. 1—3.

I have succeeded in following step by step the segmentation of *Iaera marina*, *Asellus communis*, *Porcellio scaber* and *Armadillidium* sp.?, and have also observed certain stages in the early development of *Oniscus murarius* and *Philoscia vittata*. As a result I am able to state with certainty that in none of these forms does a telolecithal segmentation occur, but in all it is of the same type and is typically centrolecithal. In *Porcellio* and *Armadillidium*, to confine our attention to these, immediately after fertilisation the nucleus occupies practically the centre of the egg, where it lies imbedded in a mass of protoplasm from which delicate processes radiate off into the yolk. Enclosing the yolk is a delicate layer of protoplasm entirely destitute of nuclei and probably, to judge by what occurs in the egg of *Iaera*, united with the central nucleated mass by a reticulum of protoplasm, the yolk being distributed in the meshes of this reticulum.

The segmentation begins with a division of the simple central nucleus and of the protoplasm which surrounds it, the peripheral protoplasm and the yolk remaining undivided, as indeed they do throughout the entire process. Thus two nuclei, each surrounded by a stellate mass of protoplasm,² are at this stage to be found near the centre of the egg. This division is repeated, so that four, then eight, and then sixteen nuclei, each surrounded with its mass of protoplasm, are formed. But as the division proceeds the nuclei come to lie nearer and nearer the surface of the ovum, until finally they reach the surface and their protoplasmic envelopes fuse with the peripheral protoplasm, several of the nuclei at the same time approaching each other somewhat, so as to form the anlage of the blastoderm, the remaining ones being scattered at intervals over the surface of the egg.

The details of the segmentation, and certain interesting phenomena which accompany it, will be fully described with figures in my forthcoming paper and I will confine myself at present to pointing out that the segmentation of *Porcellio* and *Armadillidium* and of the other terrestrial Isopods mentioned above, is identical in its character with that of *Asellus*, the only notable difference being that in the latter form a cleavage of the yolk into what Reichenbach has termed primary yolk pyramids occurs at a certain stage, though wanting in the earlier stages.

These statements are at utter variance with the observations recorded by Roule. It can hardly be possible that the European *Porcellio* differs so markedly in its developmental processes from its American representative as the two accounts would imply. My observations may be readily verified by the use of proper methods² and to

² Such as fixing in alcoholic picro-sulphuric acid, staining in Kleinenberg's

me it is clear from Roule's description that he has mistaken a stage at which the nuclei had already reached the surface for the stage immediately succeeding fertilization. This »cicatricule« is apparently the anlage of the blastoderm and his »ilots de blastolécithe« are the remaining cells scattered over the surface of the yolk. This failure to perceive the true significance of these structures is undoubtedly due to his imperfect methods, under which, as he himself states »les éléments diminuent de volume, et leurs noyaux se condensent à l'excès, en faisant disparaître, d'habitude, la plupart des détails de leur structure«. Further comment seems unnecessary.

Bobretzky's account of the telolecithal segmentation of *Oniscus* is manifestly unsatisfactory and J. Nusbaum's opinion as to its occurrence in *Porcellio* seems to be founded entirely on conjecture. The fact of the undoubted occurrence of the centrolecithal method in the four *Oniscidae* I have studied, (not to mention its probable occurrence also in *Ligia*), and their agreement in this respect with the *Asellidae* and with the majority of Crustacea are strong arguments in favor of the universality of the method throughout the entire group of the *Isopoda*.

I find my observations on the development of *Porcellio* at variance with those of M. Roule in several other respects. I shall not however consider these here; they will be more readily understood from the detailed account of my results.

University of Michigan, Ann Arbor, Mich. U. S. A., Dec. 31, 1894.

2. Zur Kenntnis der myrmekophilen und termitophilen Arthropoden.

Von E. Wasmann, S. J. (Exaeten bei Roermond, Holland).

eingeg. 15. Januar 1895.

Der innige Zusammenhang zwischen Morphologie und Biologie ist auf wenigen zoologischen Forschungsgebieten so auffallend wie bei den sogenannten Gästen der Ameisen und Termiten. Die mannigfaltigsten Formen der Symbiose, vom echten Gastverhältnis (Myrmecoxenie Emery's) bis zum bloßen Synoeketismus oder zur Myrmecophagie und zum Parasitismus treten uns hier entgegen und finden oft ihren klaren morphologischen Ausdruck in der Körpergestalt oder in bestimmten Organbildungen, die nur unter dieser biologischen Rücksicht verständlich werden. So sind z. B. bestimmte Büschel gelber oder rothgelber Haare bei myrmekophilen Coleopteren ein sicheres Zeichen, daß dieselben an den betreffenden Körpertheilen eines äthe-

haematoxylin and washing in acid alcohol until all the stain is removed from the yolk. Then clear in oil of cloves and examine as a transparent object.

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