VI - FORMATION OF THE BLASTODERM AND THE GERM BAND

In *A. proxima* the cleavage nuclei begin to migrate towards the periplasm at about three hours of incubation. Each nucleus with its surrounding cytoplasm penetrates the periplasm and as it begins to emerge a portion of the latter lying immediately over it bulges to form a pocket into which the nucleus becomes subsequently embedded (Plate 1, Fig. 4). Due to these bulgings the surface of the cortical layer becomes temporarily uneven but after the establishment of the blastoderm it becomes smooth once again. Similar condition has been recorded by Nelson (1915) in the honey bee and Bastham (192?) in *Pieris rapae*.

The time of penetration of the cleavage nuclei into the periplasm varies in different groups of insects. Further, in certain forms there is a greater concentration of nuclei on the ventral side of the egg than towards the dorsal surface. In *A. proxima* the cleavage nuclei do not reach all over the egg periphery simultaneously. In an egg about four hours old out of a total of approximately 145 nuclei, 48 are seen on the dorsal side, about 80 on the ventral and the rest are distributed on the anterior pole. From these counts it appears that initially there is a greater concentration on the ventral surface of the egg than on the dorsal. In the beginning these nuclei do not cover the egg surface uniformly but as more and more nuclei migrate the neighbours become closely spaced (Plate 1, Fig. 2). Cell walls have not yet appeared and the egg is still a syncytium.
At the age of 6-12-hours the peripheral nuclei have increased to about 237 per sagittal section. They lie in close proximity and cover the egg from all sides except a small region at the posterior pole where polar cells are being formed. Cell walls now begin to appear which mark off individual blastodermal cells. The earliest indication of the cell wall is the formation of furrows between the adjacent nuclei (Plate 1, Fig. 5) which deepen to form the lateral walls. Later, with the formation of the inner cell wall, the blastodermal cells are delimited from the underlying periplasm which is reduced to a thin layer as a greater part of it has been utilized in the formation of the blastodermal cells. The peripheral cells have a tendency to flatten, this is more marked on the dorsal than on the ventral side of the egg. The cells on the dorsal side are distinctly larger and flatter compared to those on the ventral side of the egg. The former will give rise to the serosa and the latter to the germ band.

Germ band. Shortly after 12-hours of incubation, the cells of the ventral blastoderm lose their regular cellular form and become pushed in together forming irregular rows (Plate 1, Figs. 6 a, b, c). At 14-15-hours the number of nuclei has considerably increased in the thickened syncytial strip forming the germ band from which the embryo differentiates. The rest of the blastoderm remains thin and single layered. Its large cells, in sharp contrast with those of the ventral germ, are more or less ovaloid. The germ band now begins to elongate. The posterior extremity shows faster development than the anterior one and soon comes
Text-Fig. 2. Lateral view of an embryo within the egg shell, showing early stages of segmentation. Note the caudal extremity on the dorsal side of the egg. The segments of the abdomen are not yet well defined. 20-hours.
to lie on the dorsal surface (Text-Fig. 2). In the gooseberry sawfly *Pteronidia ribesii* (Shafiq, 1954) it stops short at the anterior pole so that there is a hood of yolk in front of the germ band.