During the period of peripheral migration of cleavage cells some are left behind in the yolk to form the primary yolk cells. In other insects a variable number of peripheral cells has been observed to migrate back into the yolk. These, according to their time of origin, have been termed as secondary yolk cells. While Shafiq (1954) in *Pteronidea ribesii* has reported only primary yolk cells, there is ample evidence to regard the existence of two types of yolk cells in *A. proxima*.

In sections of eggs 8-12-hours old there are seen scattered throughout the yolk mass deeply staining islands of protoplasm containing several yolk nuclei. These nuclei either occur singly or abundantly in groups of two or more (Plate 3, Fig. 24 ye2). They stain deeply in haematoxylin and closely resemble in appearance cleavage cells that have recently migrated to egg periphery. In the present account these have been regarded as primary yolk cells.

After the establishment of the germ band yolk cells of the second order make their appearance, all differing from the primary cells both in their size and general appearance. They usually occur singly enmeshed in the protoplasmic reticulum and possess large rounded nuclei with a distinct nuclear membrane (Plate 3, Fig. 20 ye2). In the beginning they present a stellate appearance but as the embryo grows the surrounding cytoplasm becomes scanty and the cells appear more or less rounded.
This is at least their appearance by about the middle of development (45-46 hours). These cells have been termed as secondary yolk cells as they appear at a later period than the primary yolk cells. Counts made show that in early stages (20-30-hours) as many as 40-50-cells may be present in one transverse section. With the advancing age of the embryo their number is considerably reduced (20-25 cells) until at the close of the embryonic life only few cells (8-12) are seen in the yolk mass. In an embryo about to hatch they disappear altogether. In the advanced embryos they have a tendency to congregate, each cluster containing 2-6 or more cells. Some of these clusters along with the small yolk spheres have been observed clinging to the pseudopodia-like outgrowths of the mid-gut epithelial cells. Before hatching the yolk spherules disappear leaving alone, at some places, a mass which does not stain with haematoxylin. In and around these masses are seen picnotic remains of the yolk cells.

The origin of the secondary yolk cells is obscure. Their distinctive appearance and large size suggests their probable origin from the cells of the thickened ventral blastoderm, although such a migration has taken place unobserved. During the formation of the blastoderm a certain number of nuclei have been observed in the middle of the cortical layer but it could not be determined whether these nuclei become incorporated into the blastoderm or migrate back into the yolk to become secondary yolk cells. Their origin from the primary cells through progressive transformation is a possibility which can not be totally left out
of consideration.

Yolk cells have been observed dividing mitotically by Tiegs and Murray (1938) in Calandra, by Nelson (1915) in honey bee, by Eastham (1927) in Pieris and others. Amitotic division has also been recorded by several workers (vide Johannsen and Butt, 1941). In polistis (Marshall and Dernehl, 1906; quoted by Tiegs and Murray, 1938) mitosis was observed during early phases which is subsequently replaced by amitotic division. No division in yolk cells has been reported in Pteronides (Shafiq, 1954). In A. proxima, except at a few doubtful places, yolk cells have not been observed dividing mitotically. Rarely cells may be observed in pairs which gives an impression that they might have recently divided.

Yolk cells or vitellophages have been assigned the function of liquefying the yolk. There is no direct evidence in A. proxima to regard these cells as assisting in the absorption of yolk. However, the gradual fall in the concentration of the yolk cells with the advancing age of the embryo appears to be directly attributable to the decreasing amount of yolk in the mid-intestine. Finally at a time when the yolk is completely absorbed no yolk cells are seen at all.