

process of germination, in which the nuclei of the mother cells play some part. The process is quite similar to the production of red cells from the endothelial cells in the area vasculosa. Later on these same cells take part in the production of non-nucleated blood corpuscles by a process of budding.

The origin of the red blood cells in post-natal life is considered by most investigators as a subject quite apart from the embryonic origin. Here it is considered that the vasoformative cells no longer play such an important rôle in producing red blood cells, and that these corpuscles are the offspring of a different tissue. It is pointed out that in the late foetal and post-natal life, the bone marrow comes into more particular prominence as a blood producing tissue.

It is impossible to dissociate the work that has been done on the origin of the red corpuscles from that dealing with the question of the presence of nuclei in these cells. A number of authors (Klebs, Arndt and Böttcher), held that the mature red cells in mammalia possessed a neucleus, and Stricker even contended that with appropriate stains, these nuclei could be demonstrated. The idea held was that the nucleus and hæmoglobin were bound together and occupied the entire cell. However, the work of Kollman and Brunn proved that these granular bodies were free from nuclein, and, therefore, could not represent nuclei.

In view that the red cells had no morphological homologue among the other tissues, a number of authors (Hayem and Pouchet), claimed that these cells arose *sui generis*. It is claimed by other writers that the platelets developed into microcytes, and, eventually, by loss of the nuclei, became fully formed red cells.

One of the later theories, which is still held by some, but, nevertheless, denied by others, is that the red cells arise not unlike the development of spores within other cells. The main supporters of this view are Schaffer, Ranvier and Minot. The blood forming cells show changes like the endothelial cells, as Minot noted in the embryo. Numerous small bodies develop in the protoplasm without showing any connexion with the nucleus of the cell, and it is only by the development of hæmoglobin within these granules that they are distinguished from the mother cell. Gradually these granules develop into spherical bodies, attaining the size of the mature red cells, and many of these are seen to completely fill the protoplasm in the original body. Klein in part accepts this view, but considers that these intracellular corpuscles, which are first non-nucleated, acquire a nucleus which in the adult red cell is again lost. According to these views the nucleus of the mother cell takes no part in the formation of the erythrocytes.