The fact cannot be denied that nucleated red cells, as were first definitely demonstrated by Neumann and Bizzozero, are present under certain conditions in the blood. Whether these nucleated cells and all the non-nucleated ones have identical origin remains undecided. These nucleated cells can constantly be found in the bone marrow of adults and in the circulating blood under pathological conditions. Jones, Drummond and others contend that the nucleated reds are derivatives from certain forms of leucocytes, and that by the acquiring of hæmoglobin and loss of their nuclei, they are developed into the red cells.

The contention was more particularly supported by Recklinghausen, who claims to have followed, under the microscope, the conversion of certain forms of leucocytes into nucleated red cells. Ranvier, using similar methods to Recklinghausen, was not able to substantiate the findings of the latter. However, some years later Pouchet found that he could follow the transition of elements like lymphocytes through stages in which they gradually acquired hæmoglobin in a process of degeneration. These cells remained nucleated.

Loss of nuclei of red cells.—Before discussing the loss of nuclei of the red blood cells, it is necessary for us to recognize that these nonnucleated blood elements come into existence in two conditions. Under certain circumstances, as we have pointed out above, the mature mammalian red blood cell may be liberated into the blood directly as a nonnucleated hæmoglobin-containing body, or, on the other hand, a nucleated red cell is first developed in the blood, which later on is converted into a non-nucleated one. The direct production of non-nucleated cells takes place as has been described, from the vasoformative cells by a process not unlike sporulation. The nucleated cells, on the other hand, may be developed from different tissue elements in the thymus, spleen, liver, bone marrow and endothelial tissue. Such nucleated cells find their way into the fluid blood, and later on pass into a stage of non-nucleated corpuscles.

In the human adult there are three types of nucleated red cells which may be recognized. Under certain conditions each of these three types may appear in the circulating blood. These nucleated red corpuscles are: 1, normoblasts; 2, megaloblasts, and 3, microblasts. The significance of these cells, has, up to the present, not been determined.

The origin of these nucleated cells is still under discussion, but it is generally recognized that the nucleated red corpuscles are normal young forms. This theory is most strongly supported by Neumann and Bizzozero. Hayem's contention that the nucleated erythrocytes arise from blood platelets, has only been supported by his own pupils.