

was in 1877-78, when Hayem demonstrated that a third corpuscle, which he termed *hæmatoblast*, did exist, but his work excited little attention either in Germany, in England, or in America. The third period began in 1882, when Bizzozero published his paper confirming Hayem's statements as the result of his investigations. Since that time about twenty different articles upon this subject have appeared and confirmed the account which was given by Hayem. Schmidt and his followers, of Dorpat, are the only notable dissenters from those views.

LECTURE II.—DEGENERATION AND REGENERATION OF THE CORPUSCLES.

Much labor has been spent in the past ten years in investigations concerning the degeneration and regeneration of the blood-corpuscles. These changes may be due to the increased destruction of the corpuscles from fever, poison, hæmorrhage, etc.; or to primary changes in the blood-forming glands; or as the secondary effect of imperfect nutrition.

The anæmia which is the result of hæmorrhage furnishes an interesting study concerning the degeneration of the corpuscles. The most important change in the corpuscles which occurs after profuse hæmorrhage, whether in man or in animals, is a change in their size. This change does not occur solely after hæmorrhage, but may proceed from a variety of causes. The normal size of the red corpuscle in the adult human being averages 7.5 mmm. in diameter. According to Hayem, normal corpuscles (red) should be divided, with reference to their size, into three grades—those which are under 7 mmm. in diameter, including about 12 per cent. of the entire number; those which are about 7 mmm. in diameter, including about 75 per cent.; and those which are larger than the ones just mentioned, and which include the remainder. In anæmia one finds many very small and some very large corpuscles, the size varying between 2.5 mmm. and 12 to 15 mmm. This subject of the variation in size of these bodies is termed by Quincke *poikilocytosis*, and has been elaborated by him under that term. The very small corpuscles are termed microcytes, and may be found in abundance in the dog a few hours after induced loss of one quarter or one third of the total blood-supply. They are also found as a rule in all cases of profound anæmia, exceptions occurring in certain cases of cancer and pulmonary consumption. It is now known, however, that they are not distinctive of pernicious anæmia, as was held by certain writers in 1876, on account of their almost constant presence in that condition. They vary in number in the different forms of anæmia, being most abundant in idiopathic or pernicious anæmia. The question naturally occurs, Are these microcytes bodies which are in the course of development or regeneration, or are they fragments of bodies which are undergoing degeneration? According to Hayem, they are one step in advance of the *blood-plaque*, but it may be considered more probable that they are fragments, which have become separated as the corpuscles become irregular and crenated, and are afterward discovered in the field of the microscope.

Very large corpuscles, or megalocytes, are also found in splenic and idiopathic anæmia, especially if the anæmia follows hæmorrhage. They may be 12 or 14 mmm. in diameter, are usually neither spherical nor bi-concave, but flatter and more irregular than in the normal condition. Their outlines vary very much, being very irregular, while normal corpuscles are very regular in outline. The opinion is advanced that the changes may be due to changes in the serum, and the use of Pacini's fluid may produce such an effect. In animals from which a large quantity of blood has been taken it has been