## PIGMENTATION CIRRHOSIS OF THE LIVER.

pigment is very interesting. It is of two kinds—very fine granules, and coarse highly refractive particles, which are generally rounded and often resemble red blood corpuscles both in form and size. In the fibrous tissue these particles are aggregated into heavy clumps and masses. In the older, less cellular , regions of the cirrhotic tissue, pigmentation is scanty, the granules being generally small and arranged along the course of the fibres. In the newer, more cellular part, where the pigment is abundant, it is quite irregular both in form and arrangement; fine granules, coarse particles, and heavy masses lying between the cells and fibres, or apparently free upon the surface. The pigment does not appear to lie within the connective tissue cells. Highly pigmented *liver cells* are seen enclosed in the connective tissue. They are sometimes completely transformed into a mass of pigment granules, and are recognisable only as the remains of liver cells, from their form and the nucleus which, though staining badly, can still be made out.

The heavy homogeneous pigment masses in the connective tissue also often resemble liver cells in form, and some peculiar spindle-shaped cells occur which, from their segmented arrangement upon each other, suggest an origin from the parenchyma. These collections of cells bear a general resemblance to fibroblasts, but the transverse segmentation is distinct from anything ever seen in cells of connective tissue origin. I would suggest that collections of cells of this nature led (or misled?) Hamilton (<sup>6</sup>) to conclude that the liver cells can function as fibroblasts in the cirrhosed liver.

The endothelium of the capillaries and of portal vessels is often pigmented. The epithelium of the new bile canaliculi is generally free from pigment. This is the opposite to what has been observed in most cases reported, and of the condition we have ourselves seen in the livers of two cases reported by Kretz ( $^{7}$ ), which we have had the opportunity of examining.<sup>1</sup>

In the liver cells the pigment, when in moderate amount, is finely granular, and is arranged along the side of the cells bordering upon the bile capillary and around the nucleus. When the cell is loaded, the granules are coarser, sometimes angular in form, and there is no regular arrangement. When pigmentation has gone on to destruction of the cell quite large particles occur, generally rounded. The variations in size and appearance indicate a gradual clumping of the finer granules into larger more refractive masses. Here and there, through the parenchyma, occur islands of such broken-down cells, represented by coarse golden-brown granules, among which young connective tissue cells are developing. In most instances of extreme pigmentary degeneration, unless the cell be completely broken down, the' nucleus still stains well. In the endothelium of the capillaries and in the leucocytes granules were observed, none were seen free in the blood stream.

When the liver was tested microchemically for iron by Perl's test, the whole section assumed a deep blue colour. Microscopically, all pigment granules had taken on a Prussian blue colour; the heavy clumps in the connective tissue are almost black, while the finer particles in the liver cells are a brilliant blue or sometimes a bluish green.

Pancreas.—Here again, as in the liver, there is overgrowth of connective tissue and extensive pigmentation. Trabeculæ penetrate the parenchyma, sending finer prolongations inward, which surround the acini or groups of acini. The new tissue seems to be of slower growth than that in the liver, for it is much less cellular, it is also less vascular. Clumps and masses of pigment lie in it, identical in form and appearance with those in the cirrhotic areas in the liver. Within the fibrous tissue islands of one or more degenerat-

<sup>1</sup> I have to thank Dr. Augenette Parry of New York for her kindness in having forwarded to me this material, which she obtained through the courtesy of Dr. Kretz and Prof. Albrecht of Vienna.