On the existence, within the liver cells, of canaliculi which are in direct communication with the blood capillaries / by E.A. Schäfer.

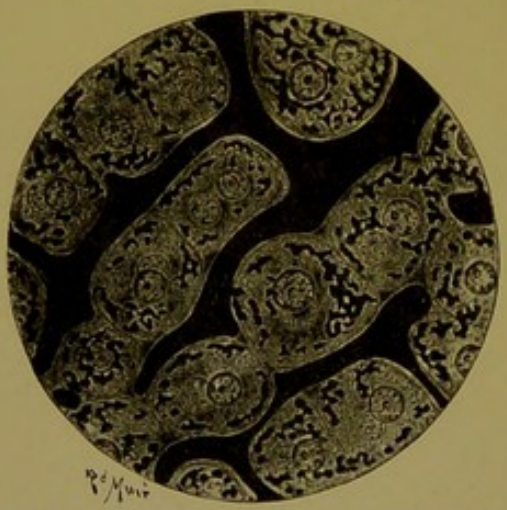
[*From the Proceedings of the Physiological Society*, January 18, 1902.]

On the existence, within the liver cells, of canaliculi which are in direct communication with the blood capillaries. By E. A. SCHÄFER.

(*From the Physiological Laboratory of the University of Edinburgh.*)

The specimens shown are from a liver which was injected with acid carmine gelatine from the portal vein. The blood vessels are full of the injecting material which has also passed into fine varicose canaliculi *within the liver cells*. There is no injection in the intercellular bile canaliculi, nor in perivascular lymphatics, nor between the cells. There is no diffusion of carmine nor any staining of the cells or nuclei by carmine. It may therefore be inferred that the injection has passed directly from the blood vessels into the liver cells; indeed here and there one can see what appear to be such direct communications.

The specimens of liver which show these appearances are from the cat and rabbit, and they have been preserved (in spirit) in this Laboratory for many years; probably since about 1886. During that time they have been frequently used for distributing specimens of



Liver of rabbit injected from the portal vein. The injection has passed into canaliculi within the liver-cells.

injected liver to members of the class of Histology. The fact that the injection has passed into the cells must therefore have been seen by many persons—Prof. Carlier tells me that he noticed it and drew Prof. Rutherford's attention to it—but the extreme importance of

the passage of injection from the vessels into such definite canals within the cells, without extravasation and without injection of the bile canaliculi, does not seem to have been appreciated; at any rate it has not hitherto been published.

The specimens appear to offer an objective proof of the conclusion which Browicz[1] has formulated from observations on appearances exhibited by the liver cells both in normal and in pathological conditions of the organ, viz. that there must exist a network of nutritive canals within the hepatic cells which are in direct communication with the lobular blood capillaries; this conclusion, Prof. Browicz tells me, he has never hitherto been able to verify by injection.

J. W. and E. H. Fraser[2] have described intracellular passages in the liver cells of frogs injected with coloured gelatine from the aorta and have also concluded that these passages are in direct communication with the blood vessels. Their injection appears to have been less complete than has been the case in the mammalian livers here described, but there is, I think, little doubt that the passages they describe are the same as those of the mammal.

[1] *Bulletin de l'académie des sciences de Cracovie*, 1899.

[2] *Journ. Anat. & Phys.* XXIX. p. 240. 1895.