

present in normal quantities, but to excrete either or both of these, if present in definite excess.

If then we are compelled to abandon the theory that glomerular activity is of the nature of simple filtration or transudation, what are the facts and observations in favour of considering that the glomeruli possess functions of a selective or secretory nature, permitting certain substances to pass through their walls and preventing others?

In the first place the glomeruli are not solely blood-capillaries. Each capillary loop is covered by a fine membrane, by a single layer of epithelium composed of cells which, having large easily-staining nuclei, must be looked upon as having actively vital properties. And one vital property, that of contractility, they have been demonstrated by Hedinger<sup>1</sup> to possess. This epithelium is a visceral extension of that lining Bowman's capsule, and so is a continuation of the definitely glandular lining of the renal tubules. In the developmental stage the glomerular epithelium appears as a layer of cubical units, of a type much more in accordance with the usually accepted idea of the characteristic gland cell than in the adult stage, where the cells are so closely united that it is only with the greatest skill that any divisions are to be recognised, so much so that many deny that there is any clear cell-boundary at all. The passage of fluid between the cells would therefore appear to be guarded against; and that this epithelial layer can act as a barrier is demonstrated by the fact that in argyria, as Riemer<sup>2</sup> has shown, the glomeruli are found darkly-stained by minute granules of precipitated silver. These granules lie outside the capillary loops, but between them and their enclosing epithelial membrane. They must therefore have been carried with the stream of water through the capillary walls, and have been stopped in their course by the epithelium. The specific power of the simplest sheet of epithelium to resist the passage not only of solids but of fluid is well exemplified by an experiment of Leber<sup>3</sup> upon the cornea. He found that the delicate layer of cells forming Descemet's membrane is the sole agency whereby the cornea is able to resist a pressure so high as

<sup>1</sup> Hedinger, *Dissertation*, quoted to me by Professor Heidenhain.

<sup>2</sup> Riemer, *Arch. d. Heilkunde* vol. xvii. p. 344 (1876).

<sup>3</sup> Leber, *Arch. f. Ophthalmol.* vol. xix. No. 2, p. 125.