

exudate and desquamated cells, while others are collapsed and more or less completely atrophied. Many of the loops of Henle contain casts, some of which are hard and fragmented, and many of the collecting tubules contain exudate and desquamated cells. There is definite increase in the intertubular connective tissue, and there are many areas of round-cell infiltration. There is no hyaline degeneration of the basement membranes of either the tubules or the glomeruli, and there is no new formation of elastic tissue. There are several areas where calcium granules are seen inside the cells of the degenerating epithelium.

**PROTOCOL 5—Guinea-pig 33.** (Fig. 9.)—A single injection of 5 mg. was given subcutaneously, and the animal was killed in one hundred and seventeen days. No analysis of the urine was made. The weight dropped from 520 gm. to 387 gm. during the first ten days, but subsequently increased to 505 gm.

**Autopsy.**—The peritoneum was not congested, but there was a small amount of fluid in the peritoneal cavity. Both kidneys were small, the left being smaller than the right, and both were red in color, distinctly granular, and surrounded by a well marked fatty capsule. The true capsule was adherent in both kidneys, and on section the cortex appeared narrower than normal. There was no bulging of the cut surface and no edema.

#### MICROSCOPIC EXAMINATION

The picture presented is that of an advanced interstitial nephritis. There is very great destruction of the renal tissue, marked proliferation of the connective tissue, extensive cyst formation, and definite irregularity of the surface of the kidney. (Fig. 9.) The most marked degree of change is in the inner zone of the cortex, but large areas of fibrosis extend to the surface and correspond to the depressions on it. The glomeruli show very marked change throughout. In the inner zone of the cortex many of them are cystic, varying in size of from two to three times their normal diameters. Some of them are empty, some show remnants of their more or less compressed tufts, and others contain exudate and desquamated cells. Their capsules show considerable thickening, notwithstanding the fact that they are so greatly distended. The glomeruli in the peripheral zone are about normal in size, but there are practically none which do not show more or less definite change. The tufts completely fill the intracapsular spaces, and show some fibrosis and some fragmentation of the nuclei, but no hyaline change. The capsules are very much thickened, there is definite hyaline degeneration of the basement membranes, and in many cases marked proliferation of the endothelial layer. Many of the glomeruli and cysts are surrounded by newly formed elastic tissue which is situated immediately outside the thickened basement membrane.

The convoluted tubules are also very much damaged. There are a few small areas where the tubules have a fairly normal appearance, but even here there is an increased number of intertubular nuclei, and in many cases the tubule is completely isolated by a thin but definite layer of connective tissue which surrounds it. The vast majority of the tubules are atrophied and shrunken, being represented by a ring of small misshapen nuclei. In some cases there is a small lumen which contains a granular exudate and desquamated cells, but there is no dilatation of the convoluted tubules. Many of the degenerated cells contain a fine granulation of calcium deposit, and the basement membranes of the atrophied tubules show marked hyaline degeneration. Many of the ascending limbs of Henle's loops are dilated to several times their normal diameter, and are lined by very much flattened and degenerated epithelium. Many of these tubules are empty, but some of them contain exudate and