

seemed to be dependent upon, and always secondary to, lesions of an obstructive character in the capillary tufts of the glomeruli. The primary glomerular followed by secondary tubular lesions is the reverse picture of the parenchymatous nephritis in dogs induced with uranium nitrate which, according to Mac Nider,² produces a primary lesion of the epithelial cells of the proximal convoluted tubules.

The appearance of albumen and casts in the urine was a constant happening in all the injected dogs. In most cases albumen and casts occurred in 24 hours after the injection of the nephrotoxic agent, while in others, these abnormalities were found only after 2 to 3 days. In addition to albumen and casts the majority of dogs showed quantities of blood and bile in the urine, though usually these abnormal substances did not appear before the third day following the injection.

Four of the acute nephritic dogs were allowed to live for 6 months or longer. These animals in 2 or 3 months after the last injection of "Lysate" apparently returned to a normal renal function as indicated by the total absence of abnormal constituents in the urine. However, at autopsy there was very definite gross evidence of chronic renal changes which was confirmed by the microscopic study.

The results of the experiment as a whole show that the toxic product of *Streptococcus scarlatinae* whether introduced intraperitoneally or intravenously has a selective affinity for the glomeruli of the kidney, affecting primarily the capillary tufts (hemorrhagic glomerulonephritis). Secondary changes of a retrograde character occur for the tubular epithelium, particularly the epithelium of the convoluted tubules. It appears that regeneration of the tubular epithelium does not occur where the corresponding glomerular tuft is destroyed.

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The Heart of the Thoroughbred Race Horse.
Studies in Hypertrophy.

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The interesting note in Sir William Osler's "Textbook of Medicine" on the heart of Eclipse, the famous race horse, and Master

² Mac Nider, Wm. de B., *J. Exp. Med.*, 1929, xlix, 387.

McGrath, the famous greyhound, has prompted investigation of the heart-weight body-weight ratios in these animals. Studies on the heart of the racing greyhound were reported in the PROCEEDINGS of 3 years ago.¹ The questions of true physiologic as well as the mechanism of pathologic work hypertrophy of the heart are still open.

We, unfortunately, do not have records of the heart-weight body-weight ratios of the great sires of thoroughbred racing stock or of the great mares that have produced long lines of winners. Accurate anatomical data on the English sires, or the lines descending from Godolphin Bart, 1689, Byerly Turk, 1706, and Darley Arabin, 1724, or of the American progenitor, Longfellow I, 1850, or the more recently famous studs, as Fair Play, Broomstick, and Man-of-War, would be most interesting and valuable.

In a group of 16 race horses of various strains, ages, and racing experiences, I have been able to obtain the heart-weight body-weight ratios and the left ventricle to right ventricle ratios. The greatest H.W./B.W. ratio, that of 110 gm. of heart per kilo of body weight, was gotten from Bronston, a horse that had been frequently "hopped" and had dropped dead during a morning workout. This horse may well have had some abnormality in his cardiovascular system.

The next highest heart weight ratio, that of 107, was found in Clorinda F, a 3-year-old, whose heart-weight body-weight ratio was actually greater than those of 3 and 4 year old horses. A note from the veterinarian stated that Clorinda F was of unusually good lineage.

Other than this the horses ranked in heart-weight body-weight ratios somewhat according to their age, the 4-year-olds having a ratio of 101 and 104, the 3-year-olds 82 to 100, and the 2-year-olds 81 to 88. The yearlings that had not been entered in competitive races averaged 71 to 84. This latter figure is considerably above that of 67.7 which is generally given for the heart-weight body-weight in horses. Thus even the thoroughbred colts apparently have comparatively larger hearts than the regular run of horses. The average of the whole series of race horses is .00925. The L/R ratios indicate that the hypertrophy is general, affecting the right ventricle as much or perhaps slightly more than it does the left heart.

These data suggest that the thoroughbred race horse has a larger heart to begin with and one that has a greater capacity for hypertrophy. The heart, furthermore, apparently responds to schooling

¹ Herrmann, George, PROC. SOC. EXP. BIOL. AND MED., 1926, xxiii, 856.

and training by hypertrophying to an unusual degree. However, the race horse averages are far below those that I found in the greyhound series, and as far as my studies are concerned the greyhound still tops the list of heart-weight body-weight ratios for mammals.

The interesting question of attributing the findings to the inheritance of acquired characteristics or to the result of selection down through generations of racing stock is again raised.