

by resistant foster mothers gave almost identical results (Fig. 1-B). Of 148 resistant young mice nursed by their own mothers, approximately 54% succumbed (Fig. 1-C), a figure which is higher than that previously reported and due, in all probability, to the discontinuance of selective breeding for 3 years. In contrast to the susceptible mice, the resistants rarely died before the 9th day, at which time nearly all the susceptibles were dead, and most frequently on or about the 11th day. Foster-nursing of 53 resistant young by susceptible mothers again produced no change in the amount or distribution of deaths (Fig. 1-D).

*Summary.* In strains of mice selectively bred for resistance or susceptibility to St. Louis encephalitis virus, foster-nursing exerted no effect upon the course of disease or mortality-rate following nasal instillation of virus.

## 11867 P

### Secretion of Inulin by the Kidney of the Crayfish.\*

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Cumulative evidence indicates that inulin is not secreted by nor passively reabsorbed through the vertebrate nephric tubule (Smith<sup>1</sup>). In vertebrates, the inulin-clearance, therefore, is independent of the concentration of inulin in the plasma and is used as a measure of the rate of glomerular filtration.

In an attempt to find whether filtration occurs through the nephron of the crayfish by the use of inulin, the writer obtained most unexpected results as regards the inulin-clearance. This is the first invertebrate kidney which has been studied from the standpoint of "clearances". Inulin was measured by a micro-adaptation of the Shaffer-Hartmann-Somogyi method.

Nowhere in the crayfish nephron<sup>2</sup> is there a tenuous syncytium such as constitutes the glomerular capsule of the vertebrate nephron.

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\* This work was performed largely during the tenure of a Johnston Research Scholarship at The Johns Hopkins University. The measurements of inulin-clearance were completed in the Department of Tropical Medicine, Tulane University.

<sup>1</sup> Smith, H. W., *The Physiology of the Kidney*, New York, Oxford University Press, 1937.

<sup>2</sup> Maluf, N. S. R., *Zool. Jb., Abt. f. allg. Zool. u. Physiol. d. Tiere*, 1939, **59**, 515.

The renal arterioles open freely into the cavernous haemocoel which follows the numerous involutions of the renal epithelium. The kidneys of the crayfish consist of a pair of relatively large nephrons, each of which ends blindly in a highly lobulated coelomosac.

Contrary to the condition in the vertebrate aglomerular kidney, inulin, xylose, and glucose appear in the urine of the crayfish after being injected into the blood stream. This, however, is not proof of filtration because the inulin-clearance is not independent of the concentration of inulin in the plasma. The inulin-clearance: plasma-inulin curve (Fig. 1), which resembles an adsorption isotherm, shows that inulin is outwardly secreted. This is further indicated by the fact that the shape of the curve in Fig. 1 is determined practically entirely by the urine/plasma ratio for inulin (Fig. 2).

The sudden decline in the inulin-clearance with augmentation of the plasma-inulin (Fig. 1) indicates that inulin is not appreciably filtered. Filtration, therefore, apparently does not occur through the crayfish nephron.

Since the labyrinthal portion of the crayfish nephron is the only tissue of the body which is capable of accumulating and outwardly secreting a number of dyes (cyanol, phenol red, indigo disulfonate, acid and basic fuchsin),<sup>3</sup> it seems probable that inulin, xylose, and

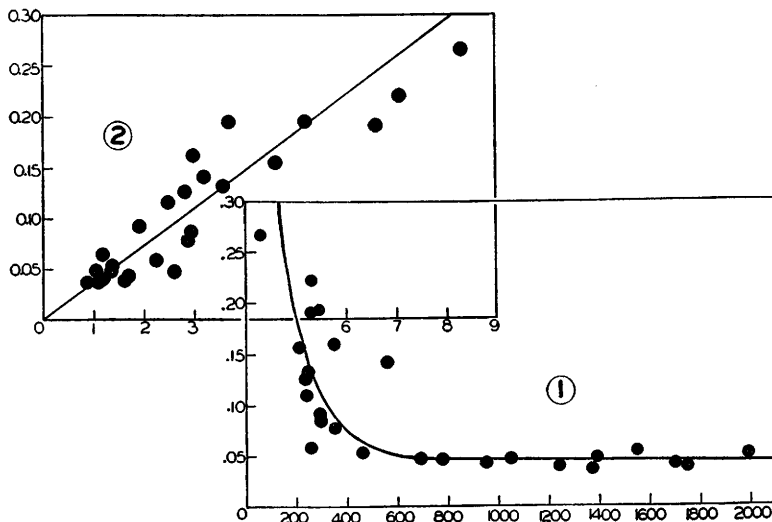


FIG. 1.

The inulin-clearance (ordinate) in cc per hour as a function of the plasma-inulin concentration (abscissa). Each point stands for a single separate crayfish.

FIG. 2.

The urine/plasma ratio for inulin (ordinate) as a function of the plasma-inulin concentration (abscissa). Each point stands for a single separate crayfish; the same individuals as in Fig. 1.

<sup>3</sup> Unpublished data.

glucose are outwardly secreted by the labyrinth. In contrast to the condition in the aglomerular nephron of vertebrates, cyanol, a blue anilin dye, is outwardly and rapidly secreted by the crayfish kidney even when present in low concentrations in the plasma. Evidently the labyrinth has varied secreting capacities.

The maintenance of an internal aqueous and saline steady state, in spite of a constant inward diffusion of water, is known to be due to the unvarying capacity of the crayfish nephron to eliminate urine that is markedly hypotonic to the blood. Since filtration apparently does not occur through this nephron, the hypotonicity cannot be explained by a reabsorption of salts but, like the aglomerular teleost kidney, is evidently due to a secretion of water.

The above facts permit the following conclusions with regard to the physiology of the nephron of the crayfish: 1. Inulin is secreted. 2. Filtration is evidently not an appreciable factor in urine-formation. 3. The manufacture of a hypotonic urine must be due to a secretion of water.

## 11868 P

### Treatment of Cecal and Liver Trichomoniasis in Turkeys by Fever Therapy.

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Since 1937, experimental work has been in progress on the use of fever therapy for the cure of cecal and liver trichomoniasis in turkeys, a widespread disease of domestic fowls caused by the protozoan parasite, *Trichomonas gallinarum*. This organism invades the tissues of the lower digestive tract of birds and in chronic infection produces lesions in the ceca and liver. These lesions closely resemble, and undoubtedly have been often confused with, those produced by *Histomonas meleagridis* in the disease commonly known as black-head. Birds with chronic trichomoniasis are droopy in appearance, refuse to eat, and lose weight. The droppings become quite liquid and light yellow in color. Young birds usually die 4 to 8 days after exhibiting the first symptoms of the disease, although in mature birds the period between the first symptoms and death may be much longer.

Most of the turkeys used in this preliminary study were naturally