and the perirenal fat was indurated. There was no evidence of sepsis.

Sections of the transplant were fixed immediately after removal. In three of the transplants microscopy showed various stages of tubular degeneration. One showed definite necrosis of tubular epithelium and tubular casts. The others showed slight glomerular and peri-glomerular lymphocytic infiltration, but no tubular degeneration. The perirenal fat showed lymphocytic infiltration and red cell extravasation. The pelves showed subacute inflammation.

Conclusions. The length of survival or function of homogenous kidney transplants is not improved by the administration of ACTH or cortisone.

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Effect of Proteinuria on Localization of Radiomercury in Rat Kidney.* (18681)

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It was shown by the use of radiomercury-labeled diuretics that these compounds are selectively concentrated in the kidneys of patients(1) and in the kidneys of normal dogs(2). In our previous work(3) it was found that proteinuria, produced by the intraperitoneal administration of human albumin to rats prior to the intravenous administration of a mercurial diuretic, sharply reduced renal toxicity. This effect was attributed to an inhibition of mercurial absorption when the tubules were saturated with protein. At the same time it was found that the simultaneous administration of human albumin and the mercurial diuretic resulted in enhanced toxicity. The latter effect was attributed to more rapid mercurial absorption, concomitant with rapid absorption of protein during the tubular loading phase.

The present study was undertaken in order to determine whether proteinuria was associated with an actual reduction in the amount of mercury that localized in the kidney, thus diminishing the dose to which the renal epithelium was subjected. The use of radioactive mercury with the technic of radioautography offered the possibility of a simple, semi-quantitative evaluation of the localization phenomenon.

Methods and materials. This study was performed with 24 female rats of the Slonaker strain, each weighing about 150 g, with little variation. The radiomercury used was obtained from the Oak Ridge National Laboratory and was certified to be more than 99% Hg^{203}. The radiomercury was administered in the form of mercuric chloride, 10 mg Hg per ml distilled water, at pH 5.4. In the control group of 12 animals, each received 3 intraperitoneal injections of 16 ml 0.85% sodium chloride solution, the first at 9:30 A.M., and the second at 4:30 P.M. on the first day, and the third at 9:30 A.M. on the second day. In the experimental group, each animal received similar injections on the same schedule, but each injection was composed of 6% bovine albumin in 0.85% sodium chloride solution. From previous experiments(4) it is

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known that bovine albumin, like human albumin, produces a maximal degree of proteinuria at the interval selected after such intraperitoneal administration. Immediately after the third intraperitoneal injection, each animal received 0.10 ml of the radiomercuric chloride solution by intravenous injection. This dose contained 1.0 mg Hg, with a radioactivity of 50 μc. Each group of animals was placed in a separate cage, with wood shavings in the bottom to absorb the urine and feces. Stock diet and water were given *ad libitum*. The animals were not disturbed until death, or for 24 hours, when the survivors were killed by ether anesthetization and exsanguination from the abdominal aorta. At autopsy, the kidneys were removed, decapsulated, sagittally sectioned, and dropped into 10% formalin in 0.85% sodium chloride solution. After fixation, the tissues were embedded in paraffin and sections were cut at a thickness of 8 μ. These sections were used to make radioautographs on Eastman Kodak NTB Nuclear Track Plates. Exposures were made on 10 μ and 25 μ emulsions with 8 to 15 million beta particles per cm^2. In order to eliminate errors arising from differences in emulsion sensitivity, development, etc., some control sections were mounted on each NTB plate with an equal number of experimental sections. After completion of the exposure, the plates were developed and the paraffin sections were stained with hematoxylin and eosin for microscopic examination.

Results. The control animals that received saline solution by intraperitoneal injection all died before 24 hours had passed after administration of the radiomercuric chloride. At autopsy, the kidneys appeared to be of normal size with a color that was slightly darker than the normal. Only 2 of the animals that received bovine albumin injections died during the 24-hour period. With 2 exceptions, the surviving animals appeared to be well at the time they were killed. At autopsy, the kidneys of all these animals were enlarged and pale, similar to the kidneys of animals that receive such injections of albumin alone, but somewhat larger.

A portable Geiger-Müller counter was used to survey the wood shavings in each cage which had been used to absorb the urine and feces during the period after injection of the radiomercuric chloride. The shavings used for the control animals had roughly half the radioactivity shown by the other shavings. This was considered to indicate a significant difference in the amount of radioactive material excreted.

Inspection of the radioautographs revealed a gross and consistent difference in the radioactivity of the sections. The control animals had a much higher amount of radioactivity in the cortical substance; this appeared to be about twice as much as in the experimental animals. (Fig. 1). In addition, the control animals did not show any radioactivity in the medulla, even in the plates which were overexposed. On the contrary, about one-half of the experimental animals showed radioactivity that extended into the medulla and outlined the medullary pyramids. These observations were considered to indicate that, 24 hours after injection, under the conditions of this experiment, mercury was still being excreted by the experimental animals, whereas in the control animals such excretion had ceased before they died.

Discussion. If it is assumed that all of the radiomercury injected was localized in the kidney and that none was excreted, then in a 150-g rat with kidneys weighing about 1100 mg, the kidneys would have received less than 200 roentgen-equivalents of β-radiation in the 24-hour period. Since the kidney is relatively insensitive to radiation damage(5), this factor can be ignored in the interpretation of the tracer results. The LD_{50} for total body irradiation of the rat is 500 to 600 r, and, under the assumptions made, the whole body received less than 5 r during the 24-hour period, so this factor may also be ignored in consideration of the tracer effects.

Because radiomercury-labeled diuretic was not available to us, we were obliged to use an inorganic salt for this experiment. The difference in mortality between the control group and the experimental group demonstrates that proteinuria has the same effect upon the renal

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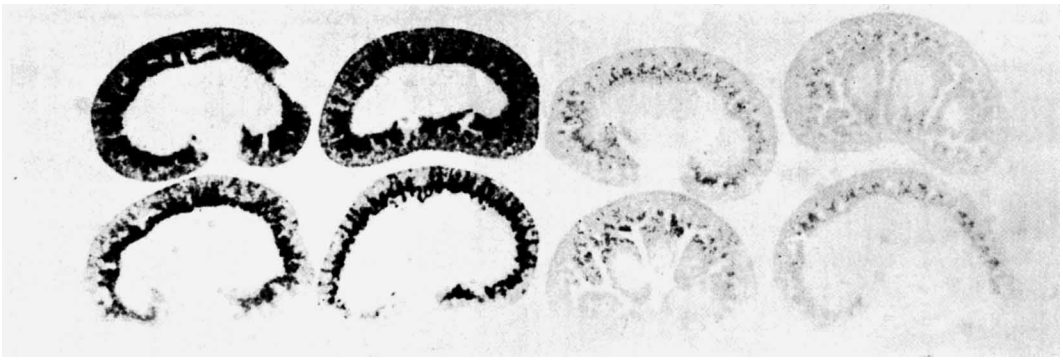

FIG. 1.
Radioautograph of kidneys, 24 hr after administration of radiomercuric chloride. Left, control group. Right, experimental (proteinuric) group. Eastman Kodak NTB plate, 10 μ emulsion, 10 million counts per cm^2, magnification about 3×.

toxicity of inorganic mercuric chloride as it has upon the mercurial diuretic.

In our previous work(3) we were unable to demonstrate that mercurial diuretic was bound by serum protein. However, since that time Milnor(6) has succeeded in such a demonstration. It is well known that mercuric ion is bound by protein, and this experiment shows that proteinuria prevents the mercuric ion from localizing in the kidney. It would seem reasonable to suppose that, in view of Milnor's work, an organic mercurial diuretic would behave in the same way.

Summary. When radioactive mercuric chloride is administered to animals rendered proteinuric by the administration of bovine albumin, less radiomercury is localized in the renal cortex than in that of the control animals. Diminished renal toxicity is associated with a diminished localization of radiomercury in the kidney.

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Sensitivity of Mice to Histamine During Respiratory Infection by *Hemophilus pertussis.* (18682)

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It was first shown by Parfentjev and Goodline(1) that pertussis vaccines can markedly increase the sensitivity of mice to histamine. Pittman(2) has reported that vaccines of relatively low toxicity may show a direct correlation in ability to induce sensitization and protection in mice; a toxic vaccine, however, induced better protection than sensitization. During her study, it was observed that a higher percentage of vaccinated mice which had survived an intracerebral inoculation of *H. pertussis,* were sensitive to histamine than other mice correspondingly vaccinated but not challenged(3). This suggested that the living bacteria might also be capable of inducing a sensitivity and that this property might have some bearing on the clinical manifestations of the disease in man. The intracerebral route of infection in the mouse is highly artificial

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