

showed that a great deal of the thorium had disappeared from the cells. No hemorrhage or fibrosis was noted at any time.

c. Kidneys. White mice killed one week after injection showed exudate and thickening of the glomerular capsule with small thrombi in the glomerular loops. Guinea pigs, rabbits and albino rats showed degeneration of the proximal convoluted tubules. Animals sacrificed one month following injection show no renal lesions.

d. Animals showed thorium particles present in the reticulo-endothelial cells of the bone marrow, adrenal glands and lung.

e. Brain, heart, vascular system, pancreas, gastro-intestinal tract, genito-urinary organs, placenta and embryonic tissues showed no evidence of thorium particles except for renal glomerular thrombi as previously noted in animals sacrificed one week after injection. The smaller animals receiving accidental mediastinal dosages while attempting intracardiac injections showed thorium in the pericardium and mediastinal lymph glands.

Summary. 1. The reticulo-endothelial cells, particularly in the liver and spleen, have been shown constantly to exhibit their characteristic property of engulfing foreign* particles from the circulation. 2. Non-toxic doses produce no histopathological changes in the tissues examined and the amount of thorium in the reticulo-endothelial cells is diminished after one month and greatly so after 6 months. 3. Toxic doses produce, in some instances, emboli and minute necrosis in the spleen and retrograde changes in liver and kidney which may or may not be permanent.

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A Study of Splenic Contraction in Various Animals.

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Since Barcroft's¹ work, a great number of authors have emphasized the importance of the spleen as a reservoir for red blood cells. Numerous experiments have been performed to visualize the dilatation and contraction of the spleen. Barcroft tried to observe the movements of this organ in the dog through a celluloid window

¹ Barcroft, *Erg. Physiol.*, 1926, **26**, 818.

which had been implanted in the upper left abdominal quadrant. Others outlined the spleen with small metal clamps and observed the changes in position of the clamps caused by the dilatation and contraction of the organ, by means of the fluoroscopic screen and roentgenograms. Benhamou, Viallet and Marchioni,² using special soft tissue technique, tried to visualize the spleen by taking radiograms with the subject in numerous and varied positions. We have not been able to use this method to our satisfaction.

The spleens of dogs, rabbits, guinea pigs and rats were roentgenographically visualized by means of intravenous administration of colloidal solutions of thorium dioxide (Thorotrast), and the contraction of the spleens studied under the fluoroscope and on radiographs after the injection of adrenalin, after bleeding and after shock. Hematocrit determinations of the peripheral blood were taken while the spleen was dilated, following intravenous administration of chloralose solution and at intervals of one minute, 3 minutes, 5 minutes, 15 minutes, and 30 minutes following intravenous injection of adrenalin. Simultaneously with the hematocrit, radiographs were made.

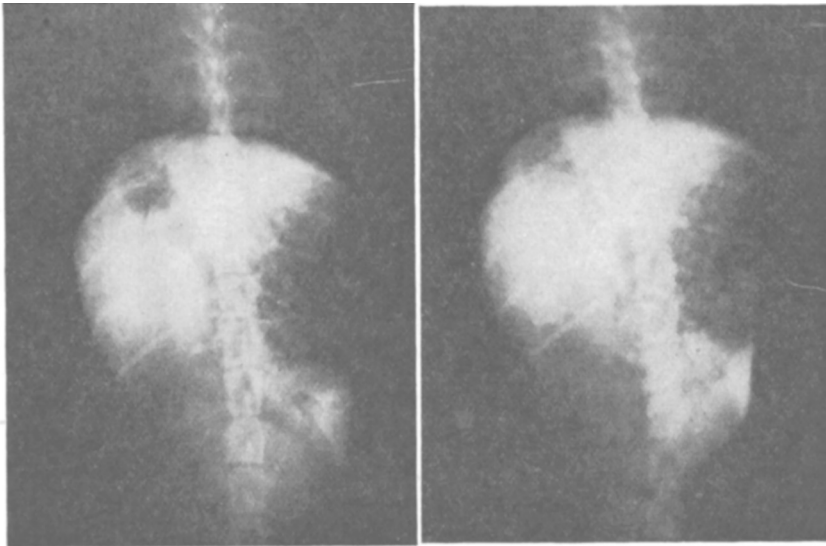


FIG. 1.

FIG. 2.

Fig. 1 shows the dilated spleen of a dog and Fig. 2 shows the contraction of the same dog's spleen 3 minutes after the intravenous injection of adrenalin. Hematocrit values of the peripheral blood

² Benhamou, Viallet and Marchioni, *J. de radiol. et d'electrol.*, 1931, **15**, 147.

cells showed an increase of 23% three minutes after the contraction of the spleen. Repeated experiments on the same dogs and on other dogs showed a correlation between the contraction of the spleen and the increase in the peripheral hematocrit reading. In the experiments with guinea pigs and rabbits, only slight, if any contraction of the spleen after adrenalin injection, bleeding or shock was produced. In accordance with this fact, erythrocyte counts and hematocrit determinations from the peripheral blood showed no notable increase after the administration of adrenalin. The spleen of rats showed distinct contraction after adrenalin, although the contraction is not as marked as in the dogs. These results are in accord with the experiments of Lauda and Haam,³ who found that the spleen of rats is able to express only 3.3% of the total hemoglobin of the animal.

The important facts shown in our series of radiographs of splenic contraction in various animals are as follows: 1. Excellent contractions are obtained in dogs. The increase in the peripheral hematocrit determination is dependent upon the degree of contraction of the spleen. 2. The spleen of a rabbit and guinea pig has slight, if any, contractility powers. 3. The spleen of the albino rat shows contractions which are distinctly visible, but not as marked as the spleen of the dog. 4. Different results obtained in investigations concerning the variation of hematocrit blood volume in different animals can be explained by the fact that a different degree of contractility exists in the spleens of dogs, guinea pigs, rabbits, and rats.

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Observations on Decerebration by Embolism.

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Langley,¹ Mellanby,² and Edkins and Murray³ have used intra-carotid injection of starch as a method of decerebration for cats or rabbits. Observations in this laboratory on more than 40 dogs "decerebrated" with starch suspension (10%, 0.5 cc. per kg. or 2 cc.

³ Lauda, E., and Haam, E., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **29**, 260.

¹ Langley, J. N., *J. Physiol.*, 1912, **45**, 239.

² Mellanby, J., *J. Physiol.*, 1919, **53**, 1.

³ Edkins, Nora, and Murray, Margaret M., *J. Physiol.*, 1924, **59**, 271.