

thelium and the deposition of the material in the portal tracts is, however, a more definite histo-pathologic change than simply a phagocytic reaction on the part of the reticulo-endothelial system.

It is possible that the white rat presents a somewhat different response than that of other animals. It is also possible that the thorium preparations vary slightly in the character of their constituents.

6211

Histo-pathological Effects of Thorium Dioxide on Lymphatic Glands of Animals Visualized by the Menville-Ané Method.

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The method of radiological visualization of the lymphatic glands by the injection of colloidal thorium dioxide (thorotrast) was described by Menville and Ané.¹ In this work the material was introduced subcutaneously in the area of the perivascular lymph spaces. The subsequent drainage to the lymphatic glands produced visualization not alone of the glandular structure but also, at times, the lymphatic vessels (Fig. 1). Through this means, the opportunity

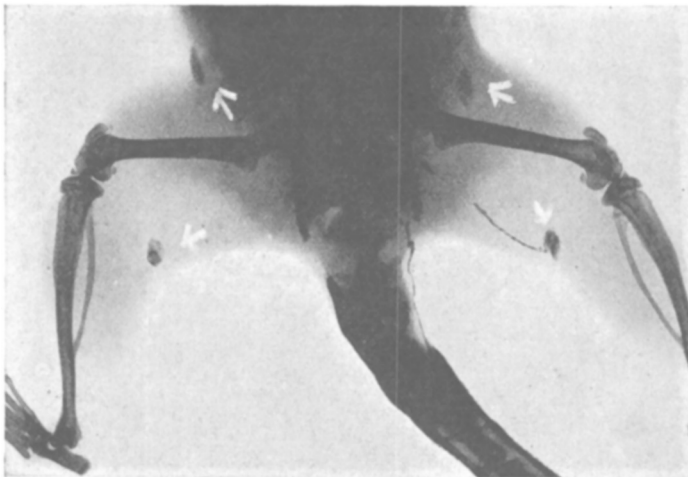


FIG. 1.

* Aided by a grant from the David Trautman Schwartz Research Fund.

¹ Menville, L. J., and Ané, J. N., *J. Am. Med. Assn.*, 1932, **98**, 1796.

has been afforded of studying the host response of the lymphatic glands thus visualized, in 5 white rats, 6 rabbits, and 3 dogs.

The tissue reactions produced have been, in certain instances, unusual and unique in their aspect. It is to be noted that aside from the injected material, these animals have been visualized with the X-ray. While it is presumed that the changes noted are due to thorium alone because of the very slight exposure to the X-ray, nevertheless the combination of these factors is to be considered. Further animal experiments separating these activities are under way.

In observations heretofore made upon both animals and the human subjects injected intravenously, the phagocytosis of thorium by cells of the reticulo-endothelial system forms the outstanding description. Huguenin, Nemours and Albot² describe, however, the production of a hepatitis and cirrhosis in the rabbit presenting thereby a connective tissue reaction apparently responding to hepatic cell injury.

In the animals of these experiments injected subcutaneously and the lymphatic glands thereby visualized, there occurs a distinctly stimulating reaction upon the connective tissues or stromal unit of the glands, with loss of the lymphoid structure. At times, associated with the connective tissue increment there occurs an enlargement and evident stimulation of the cortical nodules, indicated especially by the great increase of the germinal or keim centers. The

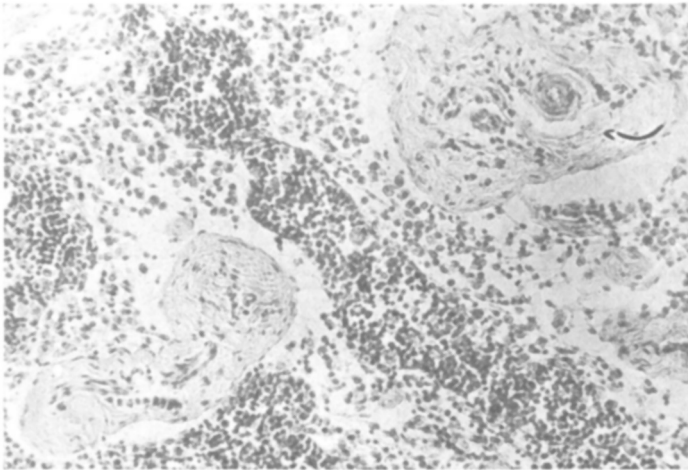


FIG. 2.

² Huguenin, R., Nemours, A., and Albot, G., *Comp. rend. de Seances, d. l. Soc. d. Biologie*, 1931, **35**, 879.

feature of unusual interest is the perivascular connective tissue proliferation (Fig. 2) which continues to increase concentrically about the blood vessels. Phagocytic cells which contain thorium can be seen within the lymph sinuses. A more advanced picture of such changes presents complete loss of the parenchyma with connective tissue replacement in which the lymph spaces are clearly shown and at times appears dilated (Fig. 3). Occasionally masses of phagocytic

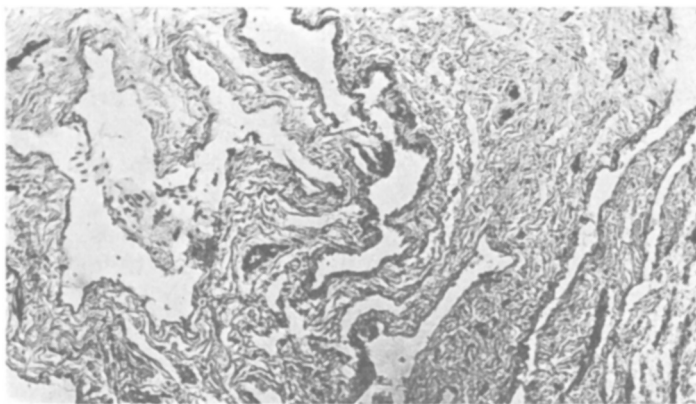


FIG. 3.

cells containing thorium show a surrounding encapsulation of connective tissue. At the site of local inoculation, masses of foreign body giant cells or macrophages are found heavily laden with thorium granules.

The biological effects produced upon lymphatic glands visualized by the subcutaneous injection of thorium are unusual in character and differ from those resulting from radium or X-ray.³ As this resultant activity may represent changes of subsequent important significance in other studies, the results have accordingly been presented.

³ Wood, F. C., *A Text-book of Path.*, Delafield and Prudden, 1931, William Wood and Co., N. Y., 14.