and lens proteins. On the basis of work done in this laboratory, and elsewhere, it seems highly probable that the primary effect of radiation is a surface phenomenon which involves the change in permeability to salts or their ions, with a subsequent precipitation of lens proteins.

I am indebted to Drs. R. S. Lillie and A. B. Luckhardt for suggestions in the study of this problem. The work was supported in part by a grant from Dr. T. J. Williams of Chicago, and in part by a grant from the radiation fund of the National Research Council.

4842

Roentgen Ray Visualization of Spleen Following Injection of Emulsions of Halogenated Oils.*

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In view of the well known phagocytic properties of the cells of the reticulo endothelial system for finely divided foreign materials injected into the blood stream an attempt was made to visualize organs containing these cells by injecting particulate matter which was relatively opaque to roentgen rays.

Using gum acacia as an emulsifying agent an emulsion of lipiodol was prepared. A few of the droplets of oil were larger than erythrocytes in the best emulsion which could be prepared by trituration in a mortar. This emulsion was diluted with 5% gum acacia solution and injected into one of the tail veins of white rats. Doses varying from ½ cc. to 4 cc. of oil per kilo body weight were given. Seven rats were so injected. Four receiving smaller amounts survived indefinitely. One died about 36 hours after injection and one died within one minute of injection. The third was killed when in a dying condition. Because of the more recent findings of Crandall and Walsh[1] we subsequently used a gum acacia-water emulsion of the bromidized esters of olive oil. This emulsion was very kindly supplied by the Abbott Laboratories.

Eleven rats weighting from 200 to 300 gm. have received intravenous doses of this material in amounts varying from ½ cc. to

* This work was done under a grant from the Douglas Smith Foundation for Medical Research of the University of Chicago.

[1] Crandall and Walsh, *Radiol.*, 1929, xii, 499; unpublished work.

3 cc. per kilo body weight. All have survived. Six of them, 2 months later, have received a second dose. The emulsion was diluted

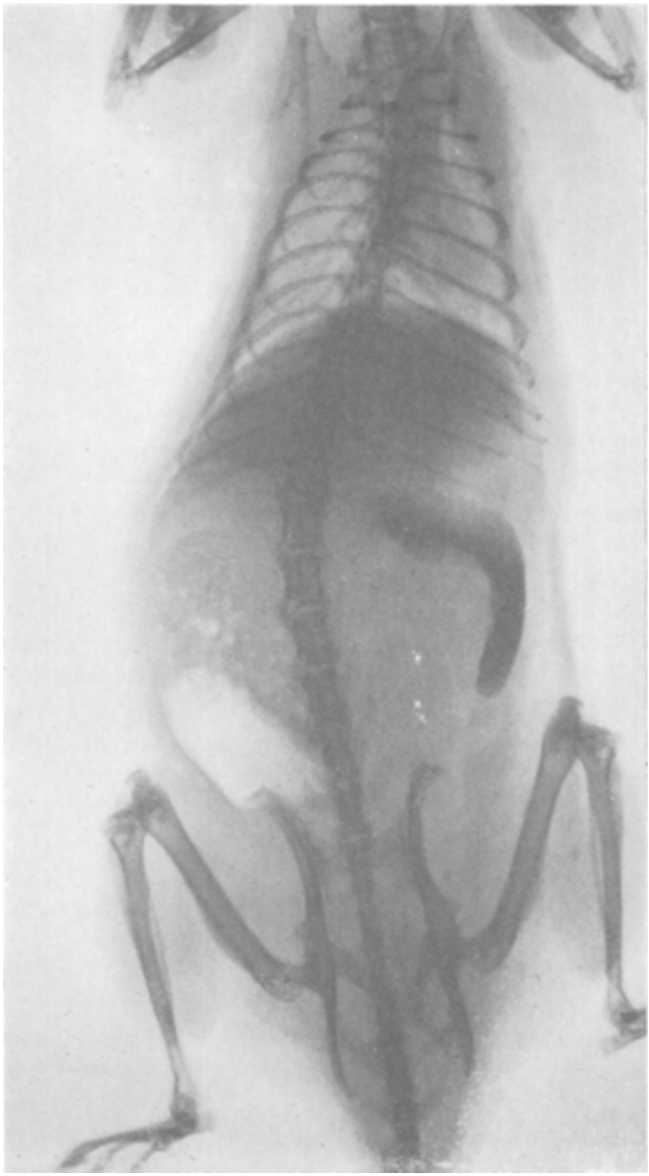

FIG. 1.

This rat received between 3 and 4 cc. of lipoidol per kilo body weight on 10/25/29. The oil was given as a rather imperfect emulsion, in 2 doses, each of 5 cc. of fluid and 10 minutes apart. The animal was killed, when in a dying condition, on 10/28/29. X-ray was taken 1 hour after injection.

in physiological saline and given in a volume of 5 cc. or less and in ½-1 minute. The minimum amount for visualization of the spleen in the rat would appear to be in the neighborhood of 1 cc. of oil per kilo body weight. The shadow appears to reach maximum intensity ½ hour after injection. The animals show slight respiratory disturbance and flushing of the skin of the ears for a few hours after injection. They appear normal the next day except in the cases of those receiving 2 cc. per kilo body weight or over. These animals appear normal on the second or third day. The shadow fades and disappears entirely within about one week, although at this time there appears to be still some oil left in the spleen. The liver shadow is slightly intensified following the injection.

A few similar experiments have been done on dogs. The long strap-like spleen can be visualized following the injection of about 1.5 cc. of oil per kilo body weight. By rapid injection or by using a concentrated emulsion it is easy to produce death by acute edema of the lungs. Further experiments are to be conducted using a more perfect emulsion.

We would like to call attention to the work of Radt.[2] His announcement appeared while this work was being done. He was able to visualize the spleen and liver in rabbits by injecting a colloidal solution of thorium dioxide.

The authors wish to thank Dr. P. R. Cannon for valuable advice and help, and the Abbott Laboratories for courtesy and cooperation in supplying materials.

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Absence of Axis Deviation of Electrocardiogram in Acute Heart Dilatation Following Experimental Embolism with Metallic Mercury.*

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The injection of 5 cc. of metallic mercury into a leg vein of adult unanesthetized dogs produces a marked dilatation of the right heart chambers a very few minutes after reaching the right heart and

[2] Radt, Paul, *Klin. Woch.*, 1929, viii, 2128.

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