the albino rat, 84 nursing young, whose mothers received stock diet No. 6‡ were sacrificed during the later part of the lactation period, and the carbon dioxide volume per cent determined on blood secured from the carotid artery. We used the manometric method of Van Slyke and Neill[2] on samples of 0.1 cc. of plasma.

Since in the pathological nursling there has been, because of stunting of growth, a considerable prolongation of the nursing period, 6 additional animals on maternal stock diet No. 6, 32 days of age, were taken during the post-lactation period. The range of carbon dioxide volume per cent found was 37 to 65.

The 72 pathological animals examined were in a condition of prolonged maintenance, or in a condition of prolonged maintenance accompanied by incipient polyneuritis. The avitaminosis of the nurslings was produced on maternal diet 1438,[3] adequate in every respect with the exception of vitamin B. Only 4 pathological animals showed a deviation from the normal which occurred during the last stages of polyneuritis. These results are in agreement with the findings of Sure and Smith[4] on growing and adult rats.

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## Vitamin Requirements of Nursing Young. IX. Effect of Vitamin B Deficiency on Glycogen Content of Liver of Nursing Young of Albino Rat.*

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In this study we have employed 50 nurslings, 29 control and 21 pathological. The animals were sacrificed by cutting both carotid arteries with a sharp scissors. The vagus nerves were also severed and death occurred almost instantaneously. The chemical method used for determination of glycogen of the livers was one kindly furnished us by Dr. C. F. Cori, which is a modification of the

‡ Stock diet No. 6 is a modification of our stock diet No. 1 (1) in which 5% of the corn is replaced by an equivalent amount of rice polishings.

1 Sure, B., *J. Biol. Chem.*, 1926, lxix, 65.

2 Van Slyke, D. D., and Neill, J. M., *J. Biol. Chem.*, 1924, lxi, 523.

3 Sure, B., and Smith, M. E., *J. Nutr.*, 1929, i, 537.

4 Sure, B., and Smith, M. E., *J. Biol. Chem.*, 1929, lxxxiv, 727.

* Research paper No. 143, Journal series, University of Arkansas.

Pflueger method[1] used by Cori and Cori in their studies on "The Fate of Sugar in the Animal Body."[2] In the case of normal animals and those animals whose livers contained appreciable amounts of glycogen, the Folin-Wu method[3] of determining apparent sugars was used. In cases where the livers contained very small amounts of glycogen we substituted the Folin micro-ferricyanide method.[4] The glycogen content of the livers was expressed in terms of glucose, *i. e.*, total reducing sugars.

It was found that the glycogen content of the livers of the nurslings on maternal stock diet No. 1,[5] which is the control ration, varied from 1300 to 1600 mg. of glucose per 100 gm. of liver. On the other hand, the glycogen content of the livers of the polyneuritic nursing young[6] showed a range of 20 to 110 mg. of glucose per 100 gm. of liver. Expressed per 100 gm. of body weight, the glycogen content of the control animals showed a range of 45 to 56 mg. of glucose; whereas, the pathological group showed a range of 0.8 to 6.2 mg. of glucose. The marked decrease in the glycogen content of the liver is the most pronounced chemical change we have found to date in nursing young suffering from uncomplicated vitamin B deficiency.

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## Vitamin Requirements of Nursing Young. X. Effect of a Deficiency of Vitamin B Complex and Vitamin B on Histological Changes in Liver of Nursing Young of Albino Rat.*

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A total of 303 animals were employed for this work, 156 on control diets, 67 on a maternal diet deficient in the vitamin B complex,[1]

[1] Pflueger, E., in Abderhalden, E., *Handbuch der biochemischen arbeitsmethoden*, Berlin and Vienna, 1910, ii, 1070.

[2] Cori, C. F., and Cori, G. T., *J. Biol. Chem.*, 1926, lxx, 557.

[3] Folin, O., and Wu, H., *J. Biol. Chem.*, 1920, xli, 367.

[4] Folin, O., *J. Biol. Chem.*, 1928, lxxxi, 231.

[5] Sure, B., *J. Biol. Chem.*, 1926, lxix, 65.

[6] Sure, B., and Smith, M. E., *J. Nutr.*, 1929, i, 537.

* Research paper No. 144, Journal Series, University of Arkansas.

[1] Sure, B., *J. Nutr.*, 1928, i, 139.