distilled water.* One cc. of this solution contains the phosphorus equivalent contained in 10 gm. of the Steenbock Diet No. 2965 plus 0.4% $K_2HPO_4$. We assumed that each rat ate 10 gm. of diet daily. Hess[1] states that the addition of 0.4% secondary phosphate prevents rickets when added to a rachitogenic diet.

The animals were all confined in a dark room, the drinking water being distilled.

The animals all lived, but one rat in Group I and one in Group II lost weight and were discontinued as test rats.

The respective diets of each group were continued for 28 days, when all the animals were killed, the femurs removed, cleaned, weighed and ashed.

RESULTS:

Group I. Bone ash, % of wet weight = 28
Group II. Bone ash, % of wet weight = 45
Group III. Bone ash, % of wet weight = 45

The importance of an adequate mineral supply in the reconstruction of rachitic bones has not been sufficiently stressed in the past. It is demonstrated that the addition of $Na_2HPO_4$ in adequate amounts to a low phosphorus rachitogenic diet produces a bone ash comparable to the bone ash produced by adding pure vitamin D to such a diet.

6414

## Failure to Produce Dental Caries with High Carbohydrate, and with Extremely Low Fat Diets.

C. A. LILLY AND J. D. GRACE. (Introduced by L. H. Newburgh.)

*From the Department of Internal Medicine, Medical School, University of Michigan.*

A. It is frequently stated that a high carbohydrate diet tends

* The $Na_2HPO_4$ was given as follows: Each rat was removed from the cage, the thumb and index finger of the left hand firmly, yet gently, grasping the skin of the nape of the neck, while the ring and middle finger secured the fore legs. The rat was thus securely held with its back in the palm of the left hand. The solution of $Na_2HPO_4$ was then introduced drop by drop well back in the rat's mouth by means of a one cc. curved medicine dropper held in the right hand. This procedure requires much kindness and patience, and often as long as 15 minutes are consumed in getting 1 cc. of fluid "down" the rat.

[1] Hess and Unger, *J. Biol. Chem.*, 1922, **50.**

to produce dental caries. To test the truth of this statement, the following experiment was performed. Thirty albino rats, 30 days old, were removed from the breeding cages and placed in individual cages. They were then divided into 3 groups.

Group I was fed, *ad lib.*, a diet of glucose 66%, casein 20%, lard 10%, Mendel's salt mixture 4%. Into this diet 0.3 gm. Viosterol (potency 250 D) was thoroughly mixed through the melted, but partially cooled lard of the diet, and thoroughly rubbed through each 1000 gm. of the diet. In addition, each day, each rat was given 0.4 gm. of dried brewer's yeast and a piece of fresh lettuce. Thus adequate vitamins were furnished.

Group II received the same diet, except that lactose was substituted for the glucose.

Group III received the same diet, except that maltose was substituted for glucose.

The animals all grew normally. However, some of the animals in Group I (glucose) had diarrhea at intervals during the experiment. The animals all lived except one rat in Group I, and one rat in Group III, which died of an undetermined cause.

After conducting the test for 6½ months, the rats were killed, the heads cleaned, and the teeth examined under light and magnification for caries. No caries was found.

B. It is sometimes also stated that an extremely low fat diet tends to produce caries. As little has been reported relative to the influence of an extremely low fat diet on dental caries, the following experiment was performed: Ten albino rats, 4 to 5 weeks old, were placed in individual cages, in a well lighted large room. The animals were divided into 2 groups of 5 rats each.

Group I was given, *ad lib.*, a diet of casein 19%, starch 73%, Mendel's salt mixture 3%, cod liver oil 5%. Fresh lettuce was also given 6 times a week for its vitamin content.

Group II was given, *ad lib.*, the same diet, but butter fat* substituted for cod liver oil.

The animals all grew to or above normal weights. All lived with the exception of one in Group II, which died after being on the test for 5½ months.

The feeding was continued 9 months, when the animals were killed, the heads cleaned, and the teeth examined for caries. No caries was found.

*Conclusions.* High carbohydrate diets of glucose, lactose, and maltose, and extremely low fat diets (butter fat and cod liver oil) failed to produce dental caries in albino rats.

* The butter fat was a centrifuged preparation.