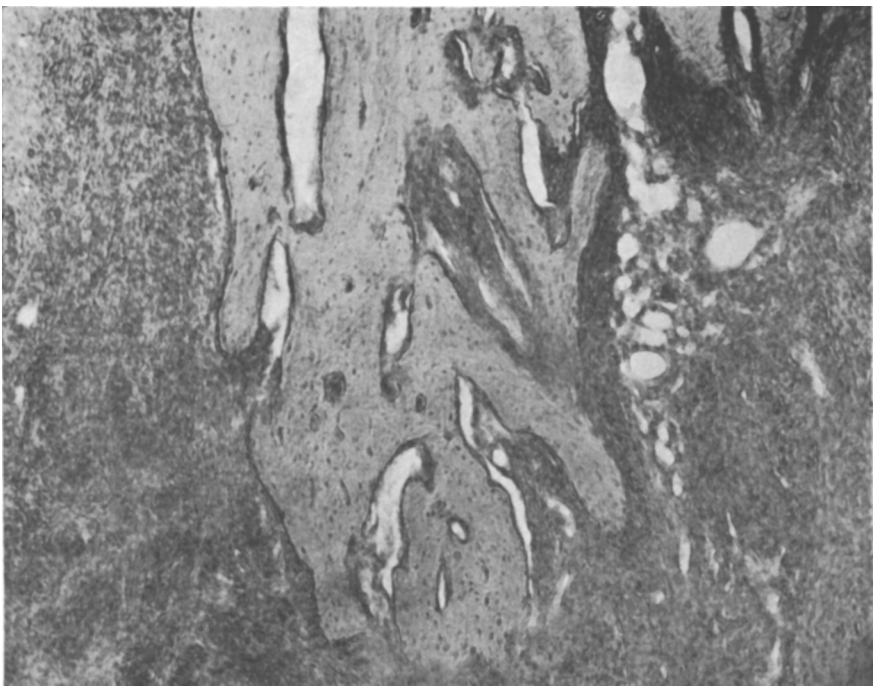

FIG. 5.
Implant IV of tumor L946A with great masses of dense newly formed bone. × 75.

Eleven months after the death of the female in whom the primary bone tumor originated, mass number II was in its ninth, III in its fifth, and IV in its seventh tissue transplant generation.

9620

Nitrogen Retention in a Child During Undernutrition.

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The purpose of this study was to determine if a child could add nitrogen to its body during a period of sharp undernutrition. A review of the literature fails to reveal any similar study. Since addition of protein to the organism is a normal accompaniment of growth, retention of nitrogen is interpreted as evidence of growth.

The subject, a 10½-year-old white female, had been markedly

overweight since the age of one year. In several previous admissions to the hospital she had lost weight as a result of controlled underfeeding. At home, however, she always rapidly gained weight. She returned to the hospital in March, 1934. Her weight was 67.97 kg. and height 150 cm. (normal is 41-43 kg.). Except for obesity and a rather dull mentality, examination revealed no abnormalities. The basal metabolic rate varied between 20 and 25% less than the normal on repeated occasions. Laboratory data were otherwise normal.

During the entire period of study the child lived in a special metabolism room where she could be constantly observed. She was weighed carefully each morning on a balance accurate to 2 gm. All food was weighed accurately to 1 gm. immediately preceding each meal. The food was of such a character that waste on the dishes was negligible. We used a constant diet of simple foods,* all of which were analyzed for total nitrogen by the Kjeldahl method. Whenever a new supply of any food was obtained, nitrogen determinations were made. Daily total 24-hourly urine and stool were excreted directly into weighed containers which were kept in the refrigerator during the collections. An aliquot of each 24-hourly collection of urine was analyzed for total nitrogen by the Kjeldahl method. All the feces for each period were dried until constant weight was reached and then analyzed for total nitrogen.

The calorific value of the diet was 600 calories in periods I and III, 800 in period IV, 1140 in period V, and 1740 in period VI (see Table I). The nitrogen content of the diet was kept constant during periods I, III, IV, V, and VI, at about 7 gm. per day. This was done in order to study the effect of varying degrees of undernutrition upon retention of nitrogen. The subject received about one gram of animal protein per kilo of ideal body weight per day. During period II the calorific value of the diet was the same as in period I but the nitrogen intake was increased to 8.35 gm. per day (see Table I).

* Powdered skimmed milk (Merrell-Soule Co.).
Egg, hard cooked
Whole wheat bread.
Tomato juice.
Grapefruit juice, canned, unsweetened.
Grape jelly.
Washed bran (Cellu).
Butter.
Whole milk.
Cream, 40%.

Changes in the caloric and nitrogen content in the diets of the different periods were accomplished simply by changing the amounts of the above foods.

TABLE I.

Period	Date 1934	No. of Days	Change of Weight in Kg.	Diet			Total gm. per period of Excretory N		Gm. N retained per period	Gm. N retained per day
				Calories per day	Gm. N per day	Total gm. N per period	Urine	Feces		
Prelim.	3/27-4/23	28	— 4.11	600						
I	4/24-5/14	21	— 2.53	600	6.87	144.12	121.10	10.73	12.29	0.54
II	5/15-5/24	10	— 1.36	600	8.35	83.50	72.91	6.98	3.61	0.36
III	5/25-6/6	13	— 0.91	600	7.02	91.22	76.99	8.10	6.13	0.47
IV	6/7 -6/27	21	— 2.69	800	7.14	149.94	130.26	12.63	7.05	0.34
V	6/28-7/9	12	— 0.60	1140	7.09	85.08	69.08	5.71	10.29	0.86
VI	7/10-7/14	8	+ 0.02	1740	7.02	56.16	41.26	5.40	9.50	1.19
Total		113	—12.18						48.87	(Aver.) 0.57

During the entire period of undernutrition there was an average daily retention of 0.5 gm. of nitrogen (periods I through V). Although the retention of nitrogen increased as the calorific value of the diet approached maintenance, there was a significant and constant storage of nitrogen during the periods of the most severe undernutrition. The average of the 44 days, when 600 calories were being fed, (periods I, II, and III) was 0.5 gm. of nitrogen per day. On the other hand, with a constant calorific value of the diet, an increased nitrogen intake (period II) did not increase the nitrogen retained. Over the period of study the child lost 8 kg. of body weight while she retained 49 gm. of nitrogen.

Summary. An obese child, who was sharply underfed for 85 consecutive days, retained a large amount of nitrogen while losing 8 kg. of body weight Although there was a significant and constant retention of nitrogen during the period of most severe undernutrition, the retention of nitrogen gradually increased as the calorific value of the diet approached maintenance. Increasing the nitrogen of the diet did not increase the retention of nitrogen while the subject was being severely underfed.

9621

Relationship Between Vitamin D Intake and Linear Growth in Infants.

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Over a 3-year period the Research Laboratory of the Children's Fund of Michigan, cooperating with the Children's Hospital of Michigan, has studied the effect of certain accessory food factors on nutrition, growth and development of infants during the first year of life. Data have been collected which appear to confirm the findings of Stearns, Jeans and Vandecar,[1] who, in an extensive individual study, demonstrated a close relationship between vitamin D intake and linear growth.

Over 500 infants* from urban families of indigent or near-indi-

[1] Stearns, Genevieve, Jeans, P. C., and Vandecar, Verva, *J. Pediat.*, 1936, **9**, 1.

* The expenses of this study were defrayed in part by grants from the Borden Company and the Gerber Products Company.