blue on exposure to ultraviolet rays, but by prolonged irradiation they are peptized to stable red sols. Falk and Reed,[7] working on the alterations in red blood cell electrophoretic potential produced by direct irradiation of blood *in vivo* reported a slight decrease of potential difference. Mayer[8] says, "So far no attention has been paid to the importance of the nature of the electrical charge on a substance that is irradiated by ultraviolet light. A study of the effect of light on body tissues from this point of view promises interesting results."

A detailed account of these findings will appear in a technical bulletin of the Pennsylvania Agricultural Experiment Station. For progress reports see [9, 10].

5546

Effect of Basic Diets on the Rate of Incisor Tooth Growth.

WILLIAM G. DOWNS, JR.

From the Department of Pathology, Yale Medical School.

In a series of studies on the effects of diet on bone healing and growth and tooth development and growth of the albino rat, it was decided to measure the rate of growth of the incisor teeth after the method of Addison and Appleton.[1] The following is a preliminary report.

The animals were males of approximately 6 months of age, and weighed between 190 and 300 grams, averaging 243 grams. All the animals on each type of study were kept under as nearly identical conditions as possible. A group of over 200 controls were fed on the standard diet of Smith and Moise.[2]

Other groups of 140 animals, were fed on a high-protein diet, on a high-fat diet, on a high-carbohydrate diet.[2] Similar groups were then given the standard diet with the salt mixture varied so as to result in a low-total salt diet in one instance, a (nearly) calcium-free

[7] Falk and Reed, *Am. J. Physiol.*, 1926, **75**, 616.

[8] Mayer, Clinical Application of Sunlight and Artificial Radiation. Williams and Wilkins, Baltimore, 1926, 355.

[9] Lisse, Bull., 1928, **230**, 6; 1929, **243**, 6; 1930, **258**, 8. *Penn. Agr. Exp. Sta. Ann. Reports.*

[10] Tittsler and Dozois, Bull., 1930, **258**, 28. *Penn. Agr. Exp. Sta. Ann. Reports.*

[1] Addison, W. H. F., and Appleton, J. L. T., Jr., *J. Morph.*, 1915, **26**, 43.

[2] Smith, Arthur H., and Moise, Theodore S., *J. Exp. Med.*, 1924, **43**, 13.

diet in another, and a (nearly) phosphorus-free in a third. These salt mixtures were made according to the method of Osborne and Mendel,[3] and the fundamental dietary values in each case have been accurately determined by these earlier workers. All animals in each group received a similar and adequate quantity of the various vitamines.

The animals were allowed to remain on the diet for a full week before any observations were made. Groups of 7 animals were then killed at 3-day intervals to 51 days, then at 60-day, 90-day and 6-month periods. The results of radiographic and histological studies on the teeth and jaws of these animals will be published later.

The rate of tooth growth and averages were obtained of the rate of tooth growth on each type of diet. In many instances 4 measurements were taken of each animal at each observation and the result of these 4 averaged. It was found, however, that there was so little variation in these measurements that this was not systematically followed. Measurements were made on a strict 7-day basis, even to the point of making the observations at as nearly as possible the same time in the day. (Table I.)

TABLE I. Rate of Tooth Growth.

	mm. per week
Normals	2.78
High Fat	3.05
High Carbohydrate	3.50
High Protein	3.21
Low-total Salt	2.14
PO_4 Free	2.15
Ca Free	2.30

It had been determined by Addison and Appleton, that the average rate of lower incisor tooth growth in the normal adult albino rat was 2.8 mm. per week. This was checked by our control series and our results very closely coincided with this figure. With that as a base line for normals, the observations on the other types of diets were made. The average rate of growth on a particular diet is based on not less than 100 observations taken at similar periods for each group.

[3] Osborne, Thomas B., and Mendel, Lafayette B., *J. Biol. Chem.*, 1918, **34**, 131.