nary chlorophyll, occurred under certain conditions in the leaves of poinsettias. Hence plants, as well as human beings, get a browned and darkened epidermis by exposure to ultraviolet rays. Microscopic examinations showed that these effects were accompanied with a breaking down of the outer layers of cells of the affected areas. Numerous changes in character and degree of coloration (browning or blackening) can be produced, however, by control of such factors as character of irradiation, supply of water to plant, humidity of surrounding air, presence or absence of ozone, and temperature.

4427

Motility of the Empty Stomach in Normal and Malnourished Asthenic Children.

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The problem is concerned with the motility of the empty stomach in normal children and in those who are of the asthenic type and in a malnourished condition, being underweight for the age and height. This preliminary report includes studies on 5 normal and 14 asthenic children. The age range was 4 to 14 years. In addition, there was one 17-year-old girl whose development and reactions were those of a child of 12 years.

The method used was that of Carlson.[1] A deflated balloon attached to one end of a rubber catheter was swallowed. The other end was attached by means of hard rubber tubing to a chloroform manometer fitted with a lever arranged to write on a moving smoked paper. The balloon was inflated at the beginning of the experiment and the pressure changes due to waves of contraction in the stomach were recorded. The experiments were run in the morning before breakfast after the child had fasted 14 to 16 hours. At least 3 experiments were performed on each child, each one lasting from 1 to 2½ hours. Those in which vomiting and gagging occurred were discarded. Care was taken to have the child in good condition, determined by a restful preceding night, and a normal temperature.

The tracings as taken included records of the respirations and

[1] Carlson, A. J., "The Control of Hunger in Health and Disease," Chicago, 1916.

heart beats as well as the contraction waves of the stomach as described by Carlson.[1] Variations in the types of contractions as well as in the sequence of types I, II, III, of the thirty-second rhythm and of the twenty-second rhythm were obtained. In order to compare the activity of the normal and asthenic children a method of analysis of the tracings had to be worked out. This was done by

TABLE I.

Comparative Activity of the Empty Stomach in Normal and Malnourished Children

	No. Subj.	No. Exp.	Low activity (1 & 2 & 3) average	Medium activity (4 & 5) average	High activity (6 & 7) average	High tonus (8) total	Tetanus (9) total
Normal children	5	10	14.9 min	59.9 contractions in 41.3 minutes	20.9 contractions in 12.9 minutes	10 periods (24 contractions) in 12.5 minutes	6 periods (126 contractions) in 46 minutes
Asthenics without gastro-intestinal complaints	11	27	33.9 min.	33.5 contractions in 25.5 minutes	9.3 contractions in 7.3 minutes	2 periods (8 contractions) in 3 minutes	
Malnourished Asthenics with gastro-intestinal complaints	3	10	55.2 min.	29.9 contractions in 19.3 minutes	2.9 contractions in 1.9 minutes		1 period (14 contractions) in 4½ minutes

dividing a complete cycle of activity into 9 periods, ranging in order from lowest to highest activity as follows: (1) no waves, (2) tonus waves only, (3) twenty-second rhythm, (4) thirty-second rhythm, Type I, (5) Types I and II mixed, Type I predominating, (6) Type II and I mixed, Type II predominating, (7) Type II only, (8) high tonus with superimposed contractions, (9) tetanus. The number of contraction waves in each period was also recorded. For simplicity, these periods were arranged in groups of low, medium and high activity, in each being recorded the averages of the number of contractions and the duration in minutes. The group of low activity includes periods 1, 2, 3; medium-periods 4 and 5, high-periods 6 and 7. The total number of periods of high tonus (period 8) and tetanus (period 9) are given because the number is too small to be averaged.

The subjects were divided into 3 groups, (1) normal children, (2) malnourished asthenics without gastro-intestinal complaints, (3) malnourished asthenics with complaints such as anorexia, nausea, vomiting, abdominal distress, etc. X-ray examinations of the gastro-intestinal tracts of the children in group 3 were negative. The results are shown in Table I.

From the table it can be seen that the activity in the asthenic children is less than that in normals, judged by the duration of active periods and the number and type of contractions. The most striking difference is in the tetanus periods, this being the highest possible form of activity. In a total of 10 experiments on normal children, 6 tetanus periods with 126 superimposed contractions, total duration 46 minutes, were obtained, while in the 37 experiments on asthenics, only one short tetanus period lasting 4½ minutes, with 14 contractions, occurred.

Whether the lowered activity in the asthenics is peculiar to the type or is a part of the generally poor nutritional condition, or whether the low activity is responsible for the malnutrition, are questions still to be answered.