servation can be usefully undertaken with these conditions in view.

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WAS MAGENDIE THE FIRST STUDENT OF VITAMINS?

FEW investigators have had the rare fortune to make two classical discoveries in one series of investigations. To Magendie must be ascribed such a feat. In a report entitled the "Nutritive Properties of Substances which Contain Nitrogen," which was published in 1816,[1] Magendie showed that dogs can not live upon fats, sugar and water but must have some form of nitrogen in their food. The importance of this discovery was such that it seems to have eclipsed the remainder of the report.

Magendie fed his dogs upon a diet of sugar and water. They lost weight steadily. The remainder of the experiment can not be expressed more concisely than in the author's own words:

> In the third week his [the dog's] thinness increased, his strength diminished, the animal lost his liveliness, his appetite was not so keen. At this same period a small ulceration was developing in the center of the transparent cornea, first on one eye and then on the other, it increased rapidly and at the end of a few days was more than a "ligne" [two millimeters] in diameter. Its depth increased in the same proportion; soon the cornea was entirely pierced and the fluid of the eye was flowing out. This singular phenomenon was accompanied by an abundant secretion of the glands of the eyelids.

This animal died. Autopsy showed little other than the effects of inanition. Magendie was a careful investigator. The experiment was repeated two times with identical results. Has any modern investigator presented a clearer picture of xerophthalmia?

In order to test the nutritive value of fats, a diet of olive oil and water was fed another dog. This animal died but showed no xerophthalmia. Another dog fed butter fat and water developed xerophthalmia in one eye! These results are of special interest in the light of modern work, since they are the reverse of modern experiments.

Magendie seems to have realized that he was dealing with a dietary deficiency, since he found normal chyle in his animals at the time of autopsy. His own statement is that "it is thus evident that if these diverse substances [fat, sugar, gum and water] do not nourish, we should not attribute this to the fact that they are not digested."

Magendie noted the marked changes in the urine, feces and bile that resulted from a diet lacking protein and suggested: "Can we not reasonably presume, after the experiments which I have reported, that by diminishing the nitrogenous substances in food we diminish the proportions of materials in the urine which give rise to gall-stones?"

Not only did Magendie record the production of xerophthalmia in animals but he recognized the analogous conditions in man as a result of a restricted diet. He reported this as follows:

> A very interesting experiment has recently been done by an English doctor named Stark. This doctor wishing to estimate the nutritive properties of sugar lived on it exclusively for about one month, but he was then obliged to give up this régime. He had become very feeble and bloated. In his sight appeared livid red spots which seemed to announce the approach of an ulcer. He died a short time after his experiment and the people who knew him thought that he might have been the victim of it.

Magendie closes this classical report with, "I wish that physicians would be inclined to make trials of this kind. Physiology, animal chemistry and medicine can gain from it."

Must Magendie be termed the father of the vitamin hypothesis, as well as the discoverer of the need for protein in the diet?

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[1] *Annales de Chimie et de Physique*, 1 series, 3: 66, 1816.

DROSOPHILA ONCE MORE

IN a recent number of SCIENCE[1] Dr. Bessie B. League publishes a summary of her observations on the reduction divisions in *Drosophila melanogaster*. It is gratifying to find some one on this side of the Atlantic who will admit that the phenomena accompanying the reduction division in this extremely variable species are abnormal. I have found genetical and cytological colleagues most determinedly of the opinion (not, however, expressed by publication) that the meiotic divisions of this species are quite normal, and so much so that it had not been worth while to figure them. I have had to point out that one so presumably well acquainted with the genetics and cytology of Drosophila as Professor Morgan admitted so late as 1925 that little or nothing was known of the reduction division in this species. I find great diversity of explanations offered by genetical colleagues of the peculiar situation which exists in regard to our knowledge of the reduction division in this species. I have already pointed out that although sex chromosomes in practically every other case among animals and plants are recognized and described in the reduction division, in *D. melanogaster*, in striking con-

[1] SCIENCE, 71: 99, January 24, 1930.