

about three ounces of dark-colored fluid blood trickled out, without the least appearance of coagulation having been attempted. It exhaled no smell of prussic acid. The parietes of the ventricles were a little thicker than usual. The liver was large and healthy. The spleen soft and easily broken down, resembling mulberry jam. The kidneys were firm, rather large, and slightly coagulated. The stomach contained about fifteen ounces of half-digested food, that gave out the peculiar smell of food undergoing digestion, with which also could be satisfactorily recognized the well-known odor of bitter almonds. The mucous coat of the stomach was healthy, and smelt strongly of prussic acid after the stomach had been emptied of its contents. The intestines were healthy. The brain and its coverings were healthy, but its vessels and its sinuses were filled with dark-colored fluid blood. It was quite free from any smell of prussic acid.

In this case, first, he had power to cork the bottle after having taken the poison ; indicating its paralyzing effects on the sensorium not to have been instantaneous. Second, the placid state of his features, unmarked by any act of expiring. Third, there was no scream, but he died tranquilly and silently. Fourth, the congested state of the right lung might more reasonably be referred to the effects of chronic pneumonia than to the poison. Fifth, the blood was everywhere dark colored and fluid. Sixth, the odor of bitter almonds was satisfactorily recognized in the stomach, and nowhere else. Seventh, he lived nearly ten minutes after having taken the poison.—**MR. POOLEY**, in *London Medical Gazette*.

#### DIGESTION OF VEGETABLE ALBUMEN AND FAT.

By **R. D. Thomson, M.D.**, Lecturer on Practical Chemistry in the University of Glasgow.

NEARLY three years ago, Dr. A. Buchanan communicated to me the fact, that he had frequently observed the serum of the blood to present a white appearance when a person happened to have been bled for some affection of such a circumscribed nature as not to interfere with the appetite or digestion ; but an opportunity did not occur to me of examining this peculiar serum till the end of 1843, when Dr. Buchanan was so kind as to place some of it at my disposal. The fluid presented the appearance of thin milk, being covered, after standing, on the upper surface with a whitish scum of a denser character than that which was diffused through the fluid. When the fluid was filtered, a portion of the scum remained on the filter while the liquid passed through, possessing still a milky aspect, but obviously being deprived of a considerable portion of its denser particles. Dr. Buchanan, however, observed that this white matter might be accumulated in larger quantities, or at least collected into smaller bulk, by saturating the serum with common salt, when the white matter speedily rose to the surface in the form of a creamy layer, which did not change its physical character even when kept for months. I found that the white matter, both when separated simply by

the filter and also when precipitated, if we may so speak, by common salt, contained a substance which was insoluble in æther and alcohol, and that when dissolved in caustic potash, and the solution was boiled with acetate of lead, a black precipitate of sulphuret of lead fell. These experiments were several times repeated carefully with the same result, and were witnessed by Dr. Buchanan, so that we had no doubt in our own minds that the presence of traces of an albuminous substance in the white matter of this serum was established; and we had, subsequently, opportunities of obtaining this matter in larger quantities, so as to confirm the previous experiments.

These results led to a series of researches upon the effect of food on animals, and also on man; from which it was clearly demonstrated that the white color of the serum in healthy animals is dependent on the introduction of food into the system. The detail of one or experiments will place this conclusion in a distinct point of view. It was necessary for this purpose to observe the characters of the serum of an individual who had not tasted food for such a space of time, that the effects of the previous meal should have disappeared. On the 10th of March, 1844, from a stout young man, aged 30, who had tasted no food from the preceding evening at six o'clock P. M., two ounces of blood were taken at noon, or at an interval of eighteen hours after a meal. The blood coagulated, on standing, in the usual manner, and the supernatant serum was found to possess a pale-yellow color, and to be perfectly clear and limpid.

After the abstraction of the blood, the individual dined upon twenty-four ounces of a pudding consisting of two parts of wheat and flour and one part of suet, seasoned with salt. At three o'clock, or in about three hours after the food had been swallowed, seven ounces of blood were taken by venesection from the arm. The clot formed as usual, no appearance of a buffy coat presenting itself. The serum was whitish and opaque; when heated, it became more translucent, apparently from the solution of some of the solid particles diffused through it, or, as was afterwards apparent, from the liquefaction of the fatty matter diffused through the serum. The whole fluid possessed a somewhat syrupy cast of appearance, and was very heavy, its specific gravity being as high as 1029.8. Comparing this density with the average density of serum, as we find it in physiological works, 1026½ by Dr. Thomson, 1027 to 1029 by Muller, it must be pronounced high; but as the specific gravity of this fluid has never been properly estimated in perhaps the truly healthy condition of animals, and more especially in parallel cases with that described, no conclusion can be deduced in reference to the density of the serum as compared with the normal standard. On throwing the serum upon a filter, a portion of white matter remained attached to its interior surface, while the liquid which passed through retained still a milky aspect; but perhaps the most interesting result obtained by this experiment was, that on drying the filter and holding it between the eye and the light, it was found to have imbibed a considerable amount of oily matter. The white substance remaining on the filter presented characters similar to those of albuminous or fibrinous matter.

The facts detailed having shown that there was a decided distinction between the serum of a person previous to and after taking food, it became an interesting point to pursue the inquiry, and to ascertain how long the milky aspect would continue in the blood. Accordingly, at six o'clock, P. M., or six hours after the meal, the individual was a third time bled to the extent of seven ounces. The serum was in this case very milky, and threw up, on standing, a considerable white scum to the surface, which could be drawn up by a sucker and examined. On throwing the serum on a filter, a small portion of white matter adhered to it, possessing albuminous characters; the serum passed through with a milky color, but no imbibition of oil could be detected on the filter itself. A careful examination of this specimen of serum could detect not a trace of starch by means of iodine and chlorine, and this led to the investigations detailed in the subsequent parts of this paper.

The inferences deducible from this experiment appear to be,—1st, that the serum of a healthy individual at a certain period of time, after partaking of a meal, is clear and limpid, and corresponds with the description of this fluid as we find it detailed in physiological works of authority; 2nd, that in three hours after a meal, when the food consists of vegetable albuminous matter and oil, or fat, the albumen begins to make its appearance in the blood, while a still larger quantity of fat in relation to the amount of the albumen taken into the stomach exists in the blood; and, 3rd, that in six hours, while the quantity of albuminous matter in the blood can be detected, the fatty matter has comparatively disappeared—a conclusion which is completely in accordance with the chemical properties of these substances, since we know that some kinds of fat liquefy nearly at the temperature of the human body, and will, of consequence, be in a condition immediately after their introduction into the stomach to enter the sanguineous circulation along with the water present in the stomach, since that fluid appears capable of permeating, with great facility, the coats of the intestinal canal throughout its whole length.

To determine the manner in which the food thus passes into the circulating system, is scarcely the province of the chemist. At the same time, since it appears to exist in the current of the blood without having undergone much modification of state from that which it originally possessed in the stomach, there seem no obvious arguments to present themselves against the conclusion that the food is directly absorbed from the alimentary canal by the bloodvessels themselves.

In confirmation of the experiment already detailed, the physiological part of which was conducted by Dr. Buchanan, whose great merits as a physiologist and original observer, require no encomiums from me, various repetitions on the inferior animals were conducted by myself, which it would serve no purpose to enumerate minutely, since they all conducted to the same results.

In the majority of these cases, calves were fed on gruel and milk, and after various intervals they were slaughtered. The serum, on examination, when the animal was killed from three to six hours after the meal,

was found to be milky, and to leave a greasy stain on filtering paper when the amount of milk or fatty matter used was considerable ; while the serum taken from an animal which had been subjected to starvation for a space of time, varying from twelve to twenty-four hours, presented generally a clear aspect. It has been frequently remarked that the serum of diabetic patients exhibits often a milky appearance, and the circumstance of the co-existence of disease with the white serum was considered as a proof that the disease was the cause of the color of the liquid parts of the blood ; but it has been very properly remarked by Dr. Buchanan, that the large amount of food consumed by individuals affected with this disease, affords a satisfactory mode of accounting for the presence of such profuse quantities of albuminous and fatty matter in the blood in such instances. I have recently had opportunities of studying this form of serum through the kindness of Dr. William Thomson, and I have found no reason to conclude that the blood of diabetic patients, so far as its milkiness is concerned, is more diseased than that of healthy individuals after a full meal. It is no doubt highly probable that the blood in these instances remains for a longer time loaded with the white matter than in the healthy state of the organism, and that the appetite may, by continually urging in a new supply of food, thus produce a diminished rate of digestion or assimilation in the circulating system ; but the presence of the white matter in the serum it would be erroneous to consider as a symptom of disease, at least in so far as the data entitle us to draw such an inference.

[Further experiments by Dr. Thomson, on the digestion of starch, are given in the Philosophical Magazine, from which the above is taken, but which we have no room for this week.]

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