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I.

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POISONING BY MILK.

*History of the Cases of Poisoning
by Milk which recently occurred
in a Family in this City, by F.
J. HIGGINSON, M.D. ; together
with an Analysis of the Milk, by
CHAS. T. JACKSON, M.D.*

History.

ON the 21st of May last, at about 11, A. M., I was called to see a family said to have been poisoned. The family consisted of seven, of whom four, viz., the lady of the family, her child (a girl of four or five years), a young woman who had been maid in the family and who had just recovered from a pretty severe illness, and a little girl, also a servant. The three remaining members of the family were males, and were not at home. About two hours after breakfast, that is, at about 9, A.M., the females, in quick succession and with little warning, were taken with nausea and vomiting. All, with the exception of the little servant girl, who refused, soon got full doses of ipecacuanha, which, by the time of my arrival, had produced its full effect. At this time the lady was complaining of violent pain in the stomach, which had come on a few minutes before, the vomiting having previously

ceased. Her countenance was very pale, her skin cool and moist, and her pulse feeble, though not extremely so. She was soon put into bed. Her child was lying in the lap, quiet, and unwilling to be disturbed, but not in much apparent suffering. She also was very pale, her lips slightly livid, her skin cool and moist, and her pulse feeble. She had vomited a great deal, and was still occasionally retching. The young woman was the greatest sufferer. Her countenance was deadly pale, her lips and eyelids sublivid, and her expression wild. As I entered she was tossing her arms about, and stamping violently on the floor. She was however soon calmed, the fit being evidently of an hysteric character. She had continual and violent retchings, and complained of severe pain at the stomach. The little girl was apparently more easy. Soon after her attack she had a slight dejection, which relieved her for some time.

From the mode of the attack, and their being simultaneously and similarly affected, there could be no doubt that the phenomena arose from a common cause, and that, some noxious substance introduced into the stomach. I found, on inquiry, that their breakfast had consisted, as usual, of bread and butter, milk, eggs, and coffee. No fish had been eaten in the fa-

mily for two days previously. Some, but not all of the family, had eaten cheese the preceding night. Whatever the poison might be, there was no question that it had been evacuated, as far as possible, by the vomiting, and the first indication was to check the inordinate action of the stomach, and, if possible, allay the pain. Dr. George Hayward, who had been sent for, arriving soon after me, was of the same opinion; and by his advice, laudanum was administered, in large doses, to all. Where it was not retained, opium pills were given with success.

Very soon our attention was called to the *master of the house*, who had come home on hearing of the sickness of his family. He was seized in the same manner with the rest. Soon after this, one and then the other of the two remaining members of the household came home sick from their places of business. Laudanum was given to all three, and whether owing to this, or some other cause, they suffered far less than those first affected. As soon as the stomach became sufficiently quiet, the comp. infus. sennæ was given, and repeated in moderate doses. Under this treatment they mostly improved. In one or two cases the coldness of the surface increased; in the child it became extreme, and for some time there was no pulse at the wrist;—she came to, however, under the use of warm water and paregoric. Before 2, P. M., they were all well enough to be left. Dr. Hayward saw them again before 4 o'clock; and by that time, the medicine having opened the bowels, they were all decidedly relieved, with the exception of the little girl who was mentioned as less ill than the rest.

She had refused medicine, and accordingly suffered longer than the others. On the next day a good deal of weakness was the only ill effect perceptible. As it was a great object to ascertain, if possible, the nature of the deleterious substance, I brought away about five ounces of water, and as much milk, for chemical analysis. The water I took from the copper boiler, in which the water used at breakfast had been boiled. The vessel had not been cleaned for many days.—So important a matter is this, that it is a regulation both in our army and navy, that the copper cooking utensils shall be inspected once a day by the surgeon or his assistants.—The water came through leaden pipes, but was the same that they had used for a year. The milk was taken from an earthen pan, the same which that used at breakfast had been taken from.

The analysis of the milk and the water was performed by my friend, Dr. Charles T. Jackson, whose familiarity with the processes of analytical chemistry entitle the results of his investigation to the fullest confidence. Not being able to see him when I left the substances at his house, I could give him no clue to his discovery. The next day, he told me that he had detected, in the milk, *subacetate of copper* in very sensible qualities. I have been unable to discover by what means the poison was communicated to the milk. The account of the analysis drawn up by Dr. Jackson, and which is subjoined, puts the fact beyond question. It only shows the necessity of great care, on the part of house keepers, &c., not only as to the vessels in which articles of food are kept and preserved, but also as to the

places where they are deposited.

Three only of the family took milk alone. The quantity taken by the others was, of course, very small, as it was taken in coffee. What is, perhaps, worthy of remark, is that these last took sugar with their coffee,—and this is the substance which Orfila says is the best antidote to the poison of verdigris. He states, to be sure, that large quantities are necessary for it to be of any avail; but in these cases the quantity of sugar must unquestionably have been to the quantity of verdigris, at least, as 30 to 1. Those who took milk alone, however, were the first seized.

F. J. HIGGINSON.

Analysis.

By request of my friend, Dr. Higginson, I made a chemical analysis of the milk and the water which were suspected to have contained some deleterious matter, by which a family of seven individuals were dangerously affected with symptoms such as usually result from the introduction of some virulent and very active poisonous agent into the stomach.

As several accounts in the papers of the day have stated the results of this examination, and there does not appear to be a correct understanding of the case as to the source of the poisonous matter, I have, by desire of Dr. H., consented to publish the following statement from my notes, made at the time of performing the analysis of the articles in question.

The water used by this family being subjected to a strict chemical examination, was found free from any deleterious substance, and will not require any further attention.

The whole quantity of milk sent to me for examination weighed $4\frac{1}{2}$ oz. It had a turbid appearance, though not coagulated, or sour to taste or smell. There was no sediment in the phial in which it was contained.

Process 1st.—A portion of the milk was taken, and being placed in a wineglass, was treated with a drop of diluted nitric acid, to separate the curd and the albumen of the milk, and to retain whatever foreign metallic ingredient it might contain in solution. After the curd &c. had subsided, the clear supernatant fluid was poured off, and then searched, by chemical reagents and tests, for such substances as it appeared probable it might contain. My first suspicions fell upon the oxide of *Lead*, with which coarse earthen ware is generally glazed; but neither sulphuric acid nor phosphate of soda gave any precipitate, whence we may infer it did not contain any salt of lead.

Process 2d.—Another portion was tested for arsenic by ammonia and nitrate of silver, but did not manifest any indications of its presence. The curd was also examined in like manner, without discovering any foreign matter. The only remaining article which could be suspected was *Copper*, and this was, as we shall see presently, the true source of the baneful effects on the family concerned.

A polished lancet blade being immersed in the milk which had not been treated by nitric acid, did not become tarnished; but, when immersed in the solution from which the curd had been separated by nitric acid, the surface of the steel became immediately covered with a coating of metallic copper. Lest the acid itself might be suspected to be impure, a portion of it diluted

ed with water, was tested by polished iron and by ammonia ; but it was found to be pure.

From the circumstance of the copper not being separated from the milk by the polished iron, it appears that the copper must have existed in the state of an oxide dissolved by the oily matter of the milk, or that it existed in the state of a subacetate, all the acid salts of this metal being incompatible with the uncoagulated state of the milk.

To determine how much copper the milk contained was the next and the last step to complete the analysis. The method pursued was the most simple; and, although it may be regarded by some scientific analysts as somewhat coarse, it is sufficiently correct for toxicological purposes, and has the advantage of being exempt from all suspicion of impurity in the chemical reagents employed. This process was as follows :—

Two ounces by weight of the poison milk was poured into a glass evaporating basin, and gradually evaporated to dryness over the Argand Lamp furnace, and the heat continued until the residuum was converted into a spongy carbonaceous mass, when it was removed, pulverized in a Wedgwood mortar, and placed in a crucible of platina, over a small furnace of charcoal ; the crucible and contents were then heated to ignition by urging the fire with the bellows. After the carbon had been consumed, the ashes contained in the crucible was removed, and treated with diluted nitric acid, which dissolved all but a few specks of carbon that had not been consumed. The solution, which was of a blue color, was then divided into two portions equal by measure ; one of these was treated to excess of saturation by ammonia,

when it became of a fine blue color, without any precipitate. The other half was poured into a conical measuring glass, and a rod of polished iron wire immersed in the solution and allowed to remain all night undisturbed. The next morning the copper had precipitated entirely in a metallic state upon the iron rod, and being carefully removed and dried between folded blotting paper, weighed half a grain, which is equivalent to four grains of the peroxide of copper. The small portions of milk remaining having become sour, I was unable to pursue the investigation further to determine the precise state of the oxide in the milk,—to determine which would be very difficult, unless a large quantity could be consumed.

Whence, and under what circumstances, the milk contracted this poison, it is not my part or intention to determine ; it would certainly be remarkable that so large a quantity of oxide of copper should have been dissolved in the milk, even if it had been kept in a metallic copper vessel, considering the shortness of the time and the circumstance that the milk was perfectly sweet.

CHAS. T. JACKSON.

II.

ACTION OF COLCHICUM ON THE URINE.

PROFESSOR CHELIUS, of Heidelberg, has been making a number of experiments on the urine of those who take colchicum for different complaints, and has discovered a very curious and uniform effect to result from this powerful medicine,—namely, a great increase of uric acid in the urine,—and, consequently, a great