POISONING WITH ARSENIC.

A recent criminal case in Paris, relating to poisoning with arsenic, presents various features of interest from a scientific point of view.

The facts are briefly these : On the 9th of September last year, the wife of a druggist named Danval died of an ill-defined malady. The first symptoms—vomiting, accompanied by diarrhœa—were followed by a generel wasting away . then the vomitings and diarrhœa recurred with greater violence, accompanied by an incessant cough, night perspiration, and a sensation of burning at the stomach. On the 8th of September, she complained more than ever of this burning sensation, also of her tongue being dry and stiff, and her legs nearly paralysed ; next day she died. She had been eighteen months married.

The doctors who attended her were of very different opinions as to the nature of her illness—Dr. Dervillez supposed muscular and visceral rheumatism ; Dr. Renault, a nervous affection ; Dr. Covin, a commencement of typhoid fever. It should be added that the Drs. Renault and Covin who attended the patient last, prescribed bromide of potassium, bismuth, and finally chlorhydrate of morphine.

The character of this woman's death, and the singular conduct of Danval, excited public attention, so that fifteen days after death an exhumation of the body was ordered, and experts were called in to make a chemical and medical examination of the body—M. L'Hôte for the chemical part, and Drs. Bergeron and Delens for the medical. Danval was arrested, tried in May, and sentenced to penal serviture for life.

The nature and results of this scientific examination (as they are described in *La Nature*) we shall now consider. The experts first noted the remarkable state of preservation of the alimentary canal, which retained the normal colour, and showed no alteration. Having ascertained the absence of all organic poison in the organs, they searched for arsenic, a substance which has, in a high degree, the property of conserving the tissues. They used one of Marsh's apparatuses, taking all possible precautions, and making sure that the reagents used were absolutely free from arsenic. The organs were carbonised with sulphuric acid by the method of Flandin and Danger, then the acid liquid was introduced into the apparatus. The experts observed the formation, on saucers, of spots, which they proved to be spots of arsenic, by means of the usual reagents. Repeating this examination on the various organs of the body, they found that there was arsenic not only in the liver, but also in the stomach and the intestines.

On the other hand arsenic was not found either in the sawdust or in the wood, or in the aromatic preparations mixed with the sawdust round the body. The experts further examined the medicines prepared by Danval, which might have incidentally contained traces of arsenic, also the medicinal wines, and the *vin ordinaire* which the patient drank, but without finding any arsenic. The natural conclusion was that there had certainly been ingestion of arsenic

The defendant, on the request of the judge, designated M. Bonis, professor of toxicology at the Higher School of Pharmacy, for a counter-examination. The portion of the organs that had been left in the body was examined anew by M. Bonis, but by a different method. The liver, stomach, and intestines, analysed separately, were treated with a mixture of hydro-chloric acid and chlorate of potash, to burn the organic matters ; then the liquid was introduced into the Marsh apparatus. M. Bonis thus found that the liver and the intestines contained only a very small quantity of arsenic, and that in the stomach the presence of this substance was doubtful. He estimated the proportion of arsenic contained in the whole body at about 1 milligramme, while (he said) 1 litre of Bourboule water contains 6 to 8 mgr. And, further, he stated that the presence of such a small quantity of arsenic might cause inconvenience, but would not cause death.

The two chemists, while agreeing as to the presence of arsenic, had not the same opinion (as M. Bonis) regarding the amount of it in Madame Danval's body.

Now arsenic does not exist normally in the body. In 1839, Couerbe and Orfila supposed that this metalloid existed in the bones, but since the researches of Orfila, in the works of the Academy Commission designated for the purpose, it has been acknowledged that arsenic does not exist in the system, unless it have been introduced in some form ; and this, notwithstanding the assertions of Raspail, in the Lafarge case, where this chemist maintained that arsenic existed everywhere, and offered to prove to Orfila that his own body contained it.

M. Bonis, then, did not allude to such normal arsenic, but he represented that the arsenic might have been ingested with the medicaments taken by the deceased, especially the bismuth; he also supposed that the arsenic might have come from the curtains of the bed on which Madame Danval lay, as these contained a good deal of it.

Ores of bismuth, indeed, always contain arsenic, and the first objection was serious. M. L'Hôte met it by analysing subnitrates of bismuth of different commercial origin. Of 22 samples only 3 contained arsenic, and they did not come from those who usually supplied Danval. As to M. Bonis' second observation it was the object of a more ardent discussion. The bed curtains contained about 1 gramme of arsenic per square meter, and there were about 27 m. of material ; particles might, therefore, have been detached and absorbed by the respiratory or alimentary passages. M. Chatin remarked that such absorptions take place, not by the air passages, but by deglutition, with the saliva swallowed. MM. Bergeron and Delens replied that, while aniline dyes and colours, fixed by means of arsenic compounds, had long been used in industry, this substance, engaged in an insoluble combination, was so fixed that it had been impossible to find it either in the fringes or the folds of the curtains, or in the dust gathered near the bed. The lungs contained no trace of arsenic.

The discussion was then transferred to the medical province, where it became more irritating—the experts urging the state of preservation of the alimentary canal, and the whole of the symptoms as characterised by the doctors who attended Madame Danval, which were the ordinary symptoms of poisoning by arsenic ; also the absence of any other cause to explain the death, demonstrated by the normal state of all the organs ; and, lastly, the unexplained presence of arsenic, concluded poisoning. If the arsenic was not found in greater quantity, this was because it had been eliminated by ordinary processes, arsenic being a body which is very rapidly carried off from the system, especially by the urine, and in this respect being unlike some other poisons which are localised in certain organs (*e. g.*, copper in the liver.) To these arguments, M. Gubles added the weight of his high medical authority, in favour of the probability of poisoning; citing exceptional cases, however, where people who had swallowed a coffee spoonful of arsenious acid had escaped all the primary lesions, and got off—an important point, since it concerned the case especially to know whether or not slow poisonings by arsenic necessarily produce organic lesions and fatty degeneration of the liver, as MM. Bonis, Cornil and Gallard affirmed. Mr. Cornil, indeed, remarked in the course of the trial that, unfortunately, all histological examination of the brain, the liver, the pancreas, and the kidneys, had been omitted. In absence of the important elements with such an examination might have introduced, the conclusions of the experts not affirming any lesion, MM. Bonis, Cornil, and Gallard were within their rôle in maintaining that arsenic taken in small quantities always produces lesions. The jury accepted the affirmations of the experts, and condemned Danval as guilty of poisoning by arsenic.

It is rendered evident by such debates that the physiological action of compounds of arsenic is not yet adequately known. A thorough investigation of the effects of this poison on the system would lead to results most useful in the case of trials like that above described.

PAINLESS OPERATIONS.—The antiseptic method of surgery which has but recently been introduced into this country, has been twice successfully tried at the Alexian Brothers' Hospital, Chicago, during the past two weeks. In each case a leg was amputated, and the patient rapidly recovered, experiencing no pain whatever from the use of the surgical instruments. The method of operation is as follows:—The surface of the limb to be amputated is first sponged with a solution of one part carbolic acid to 20 parts water. The instruments are placed in a solution of one part carbolic acid to 40 of water. While the operation is going on, a spray atomizer throws a stream of solution of carbolic acid, one part to 40 of water, into the wound. This makes the operation perfectly painless, and does away with the necessity for using chloroform or ether. The wound is then dressed with oiled silk saturated with sulphate of lead, which indicates the presence of sulphate of hydrogen by turning black, and shows whether the wound is suppurating. Six layers of medicated gauze are then placed over the wound, and the whole is covered with Mackintosh cloth.

THE Lord Rosse telescope is, as compared with the human eye, as 130,000 to 1 ; it has a penetrating power of 500, and can render visible stars whose light would require 60,000 years to reach our earth.