

blood. The trachea was thus opened, and directly the foreign body was forcibly expelled by an excess of coughing. Since this occasion the operation has been performed frequently, viz., five times by M. Verneuil, once by Prof. Voltolini, once by M. E. Bourdon. The *modus faciendi*, however, of M. Verneuil is somewhat different—he divides the operation into three stages, and proceeds from without, inwards. 1st. He divides the skin and soft parts; 2nd. The trachea; the third stage is the introduction of the canula, the precaution chiefly to be taken being that of not injuring the posterior wall of the trachea by too hastily or too deeply entering the tube itself with the galvano-cautery. — *The Doctor.*

THE EXAMINATION OF BLOOD-STAINS.

A commission, composed of MM. Mialhe, Mayet, Lefort, and Cornil, have furnished an interesting report on this subject (*Repertoire de Pharmacie*, July 10th, 1873; *Progrès Medical*, August 23). They point out that in the present day it is no longer possible, in the examination of blood-stains in legal medicine, to rest satisfied with the physical characters observed by the naked eye. The microscope, sometimes alone, but more often associated with chemical analysis and the spectro-scope, enables us to obtain an exact diagnosis formerly impossible in a great number of cases. Two conditions may occur.

I. When the stain is of recent date, or supposed to be so, the red corpuscles should be particularly examined, and every care taken to preserve them without change. The stains must not be washed with water, so that the hæmatine may not be altered. After insisting on the microscopic characters of the blood-stains, isolated or compared with those of various animals, the commission enumerate with care the fluids which are destructive or preservative of blood-corpuscles. Among the first, water, and particularly hot water, acetic, gallic, hydrochloric, and sulphuric acids; and of alkalies, potash and soda, even in weak solution, and ether and chloroform, and many other reagents, so alter the blood-corpuscles as to cause them to entirely disappear. Alcohol, chromic and picric acids, and bichromate of potash, preserve the corpuscles, though they alter their form. The preservative fluids are those whose composition approach nearest to serum, such as the iodised serum of Schultze, an excellent preparation, made with amniotic fluid, to which are added a few drops of the tincture of iodine, so as to give it the colour of white wine; or better, a fluid composed thus—white of egg, 30 grammes; distilled water, 270 grammes; and chloride of sodium, 40 grammes; or even a fluid containing 0.5 per cent. of chloride of sodium, or 5 or 6 per cent. of sulphate of soda.

If the stains be wetted and softened by these fluids and then examined, white and red corpuscles and fibroid particles will be observed.

II. In more difficult cases, when the microscope, owing to the alterations which time has affected in the hæmatine, can give but vague information, examination by the spectro-scope and chemical analysis enable us to arrive at precise results. The use of these means, being less known and also more delicate, requires special study.

1. *Spectrum Analysis.*—Colouring matters have the power of absorbing certain coloured rays of white light—the same always for the same substance. This is the principle on which spectroscopic examination is based. If into an analysing tube filled with water a few drops of a solution of hæmoglobine be introduced till it has the colour of peach-blossoms, the luminous rays of the spectrum passing through this fluid present two bands of absorption between the lines D and E of Fraunhofer in the yellow and the green. The same fact would be observed if a few drops of blood were substituted for hæmoglobine in the analysis. In a case of doubt, the hæmoglobine of the blood could be reduced by adding to this latter a reducing body. Destroyed hæmoglobine has a different spectrum from oxygenated hæmoglobine; a single absorption-band as large as the two former bands united, and a little to the left of Fraunhofer's line D.

2. In blood in a state of decomposition, or which has been treated by acids or caustic alkalies, hæmoglobine is changed into a new substance; hæmatine is formed, which, combined with hydrochloric acid, gives characteristic crystals. In order to obtain them, we must proceed thus. A small fragment of dried blood is placed on a glass slide; it is dissolved in a drop of water, and a minute portion of sea-salt is added. It is covered with a thin slide, and pure acetic acid is made to pass between the two slides, and it is heated over a spirit-lamp to boiling point. Acetic acid is again added, and it is heated afresh, and this is repeated till the crystals are obtained. They are rhomboidal, of a dirty brown colour, quite characteristic, and require to be seen with a magnifying power of three hundred or four hundred diameters. With the smallest quantity of blood these two reactions can always be produced—the spectrum examination and the crystals of hydrochlorate of hæmatine; and they are so certain, that the existence of one alone enables one to affirm the presence of blood.

3. The third process, though not so exact as the preceding, ought nevertheless not to be neglected. If to a very small quantity of blood dissolved in a little water be added a few drops of tincture of guaiacum and of binocide of hydrogen, a persistent blue colour is immediately produced; but this very sensitive reaction can be obtained with other organic matter, nasal mucus, saliva, etc.: it there-