XVII. REMARKS ON DR SYMONS' "NOTE ON A MODIFICATION OF TEICHMANN'S TEST FOR BLOOD."

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On p. 596 of Vol. VII there appear some strictures on the spectrum test for blood, which we consider to be not so well-grounded as the writer may think they are.

We may at the outset mention that we base our conclusions on the results obtained by us from the examination of articles in 749 cases, mostly of murder, that have come to our laboratory. In all 1819 articles, which were, or were supposed to be, bloodstained, have been examined by us in these cases.

The technique adopted by us is that devised by Hankin, whose long experience of medico-legal work led him to believe that it is the simplest and at the same time the most reliable method of obtaining the characteristic spectrum of *cyanhæmochromogen*, even when one has but a spot of blood no larger than a pin-point before one, a belief that our results have fully confirmed.

Briefly stated, the spectrum is obtained as follows:

If the stain be on a hard surface such as glass, steel, wood or cement, a fragment of it is removed by means of a sharp knife, conveyed to a microscope slide, and treated with a drop of 10 % solution of cyanide of potassium. Any superfluous fluid is removed by means of bibulous paper, and the preparation is then treated with a drop or two of solution of sulphide of ammonium, covered and examined *at once* under the $\frac{1}{2}$ " objective.

If it be a soft fabric that is stained, a minute portion of the stain is removed, plunged into boiling water for a couple of seconds, and then treated as above.

If blood be present, somewhere in the preparation there will be seen a spot of colour, the tint of which varies from the faintest pink to cherry-red, according to the amount of pigment present. If this spot be small it is brought into focus under the $\frac{1}{8}$ " objective; if it be of fair size the low power will suffice. The eye-piece of the microscope is removed and the long arm of a Browning's hand spectroscope, modified by Zeiss, is inserted into the tube. Under the short arm of the spectroscope is held a piece of paper, to reflect sufficient light for the reading of the wave-length scale, and the absorption-bands of *cyanhæmochromogen* are then identified. In rare cases only one band may be seen, but in all cases where blood is present this method of proving the existence of its pigment in the material examined will be found to be successful: for even stains that have been more than half washed-out give the characteristic spectrum when so treated.

In the wet season it often happens that all that can be seen on a blood-stained fabric is a spot or two of mould, but so far we have had no difficulty either in identifying blood in such a case, or in determining its origin by means of the precipitin reaction.

An *old* stain may require to lie soaking in the cyanide solution for about a minute, before the ammonium sulphide is added to it. The advantage of using a 10 % solution of potassium cyanide instead of a weaker solution is that the weaker solution may cause difficulty by more rapidly giving rise to diffusion of the pigment throughout the preparation: naturally the more concentrated the pigment at one spot the easier the recognition of its spectrum. Hence Hankin's use of boiling water to fix the pigment and prevent its diffusion along the fibrils of the piece of stained fabric, when the potassium cyanide solution is applied to it.

The ammonium sulphide solution should be prepared thus: strong solution of ammonia is diluted with four times its volume of water, and then saturated with hydrogen sulphide gas. Of the resulting preparation two parts are added to one part of ordinary dilute ammonia solution.

For routine practice we find it most convenient to use a small test-tube filled with this solution for the day's work, as the solution kept ready rapidly decomposes.

By so treating our stains we have no need of using Teichmann's test: for no substance save blood when treated as detailed above gives the colour reaction *plus* the spectrum of *cyanhæmochromogen*.

As to the "corpuscle test"—which Dr Symons states "has been found of very doubtful value, and very often impracticable in the case of old stains"—we would remark that we have nearly always been able to find enough

erythrocytes in a material—even earth—in which the presence of blood has been proved by the spectrum, to be able to say whether that blood was mammalian or non-mammalian. *A fortiori* we have been able to say that the cells before us were erythrocytes. By “nearly always” we mean in 97 % of cases. Only four out of 125 bloodstained specimens of earth gave rise to difficulty in determining the nature of the erythrocytes present.

For the determination of erythrocytes the fragment of stained material is allowed to soak in Vibert's fluid for half an hour, then teased out and examined under the oil-immersion lens. It will be remembered that Vibert's fluid is composed of common salt 2 grams, mercuric chloride half a gram, and distilled water 100 cubic centimetres. Of all the fluids devised by microscopists for the treatment of bloodstains we find it to be on the whole the most satisfactory, being thus able to confirm Masson's high praise of its merits.