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NEW TEST FOR CARBON MONOXIDE BLOOD.

By A. P. Reid, M. D., etc., etc.
Professor of Medical Jurisprudence and Hygiene, Halifax Medical College.

In presenting this test it is as far as I know not described by the authorities, and I was induced to attempt work on this subject owing to the indefinite results often obtained when trying to carry out the procedures generally recommended. This is, no doubt, due to the impurities existing with the CO in the blood, but then again it is desirable to have a method for its detection that is not thus negatived.

Generally speaking, in a medico-legal case in which this would be the question requiring an answer, the toxic agent would most likely be our ordinary illuminating gas, hence when I wished to demonstrate the subject to the class I used blood which ordinary gas had traversed.

The well marked crimson color was sufficiently pronounced and the ordinary spectroscopic bands readily made out, which for normal and carbon monoxide blood are so nearly alike as to be indistinguishable.

The books give methods for differentiating, but as before stated I found difficulty in diagnosing, likely due to the other foreign gaseous compounds associated with the CO.

Since it is very desirable that there be a readily applied and distinctive test which the expert could make use of, and since there are negative results with the ordinary method, I instituted a series of experiments to find out if these could not be obviated.

As a result I obtained reactions which are distinctive and readily applied.

As is generally known CO blood will but slowly, if at all, absorb oxygen, and this property is relied on as the means for differentiating it from normal blood.

The method I found satisfactory is to add a trace of ammonia (two or three drops) to the samples. This produces no change spectroscopically in either normal or CO blood except to more clearly bring out the two distinctive dark bands. If now to each be added a little on the end of a penknife, or a few drops of a solution, of pyrogallic acid (of a strength of ten grains to the ounce of water) and the samples be examined with the

spectroscope, no change will take place in the CO blood — but in normal blood the bands will get gradually fainter and in a few minutes will quite disappear and leave a generally darkened spectrum without any appearance of the bands.

The alkaline pyrogallic acid (or pyrogallol, or pyro) has the property of very rapidly absorbing oxygen—and for this purpose we know it is very largely used by photographers in developing their exposed plates —but it does not appear to have the power to disassociate the oxygen from the CO in carbon monoxide blood.

In normal blood, when the lines have disappeared (in a few minutes), if the sample be neutralized or left somewhat acid, and it be shaken up so as to be re-oxydized, the lines which disappeared will again appear, but much fainter than at first. This is a most characteristic reaction, and when coupled with their previous disappearance is not only distinctive of blood as blood, but also distinguishes the normal from blood which contains carbon monoxide.

After the addition of the pyro the color in each variety darkens, due to the change in the alkaline pyro, but in CO blood the change is trifling, whereas it is very marked in normal blood; so much so that the red color quite disappears, giving a light tawny shade, but even here when acidified and shaken up with the air the lines will return faintly.

This reaction of normal blood with alkaline pyro is so marked that it would serve to distinguish it from CO blood, independent of the use of the spectroscope.

The rapidity of the change is measured by the quantity of pyro and ammonia used; with very small quantities time will elapse before the change becomes very marked, and in this case shaking up with air will bring back the bands and change the color a little without the addition of acetic acid or any thing else.

A sample obtained by adding water to a sponge or cloth stained with the blood serves every purpose for these reactions.