XXI. THE NOMENCLATURE OF BLOOD PIGMENT AND ITS DERIVATIVES.

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(Received May 8th, 1919.)

ALTHOUGH a clear knowledge of blood pigment and its derivatives is essential to the student, teaching experience has shown how difficult it is to impress so many details upon his mind, and this is mainly because the present nomenclature requires a mnemonic effort on his part. It is perplexing because it does not logically express the relationship between the natural pigment and its derivatives. The reason for this state of things is partly the gradual acquisition of knowledge of these relationships, and partly the arbitrary way in which names were chosen by Hoppe-Seyler, whose authority at the time was sufficiently great to force his nomenclature into the scientific literature of his own and other nations.

Hoppe-Seyler cannot be acquitted of the charge of having ignored, as regards nomenclature, the claims of previous observers. Of this we may take the following examples.

(i) Stokes [1864] in the same paper in which he described the discovery of the spectrum of reduced blood-pigment, proposed on Professor Sharpey's suggestion the name "cruorin" and "reduced cruorin" (scarlet cruorin and purple cruorin). Four years later Hoppe-Seyler [1868] confirmed this discovery in the third part of his full paper on blood pigments. In some previous preliminary communications he had used Berzelius' old name "haematoglobulin¹," shortened sometimes into "haemoglobin." Under the influence of Stokes' discovery he was obliged to use a second term and employed the somewhat clumsy name "oxyhaemoglobin," promiscuously with haemoglobin, in the second edition of his text-book (1865). He was thus enabled in 1868 to ignore Stokes' nomenclature, especially since Stokes made no further communication on the subject.

(ii) To Thudichum [1867] belongs the credit of having first illustrated and described the spectrum of the pigment obtained by the action of con-

¹ From Liebreich's original manuscript notes of Hoppe-Seyler's lectures in 1863-64 (in the possession of one of us [O.R.]) it is evident that Hoppe, as he was then called, used at that time the term "haematoglobulin" exclusively.

centrated sulphuric acid on blood pigment which he called "cruentine." This fact is not even mentioned by Hoppe-Seyler [1871] when he re-labelled this substance "haematoporphyrin."

(iii) A further instance is the introduction of the term "haemochromogen" to which we shall return directly.

A nomenclature logically expressing the relationship of these substances would start from a short name for the iron-free pigment, and designate its precursors containing iron, protein, and oxygen by suitable prefixes. But an attempt to remodel the nomenclature drastically on such lines (however desirable it would be) would only lead to confusion, for the Hoppe-Seyler nomenclature is at present firmly established in physiological literature. A recent attempt to remodel anatomical nomenclature in a wholesale manner has for corresponding reasons proved to be a failure.

In one point, however, a change is possible, and strongly indicated. The name "haemochromogen," one of the greatest stumbling blocks of the student, should be deleted. The reasons for this are two: first, it is misleading, and secondly it is unnecessary.

It is misleading because the substance is not a "chromogen" in the modern sense, but a coloured substance. The term, therefore, is ill-chosen, and does not in the least indicate its nature.

It is unnecessary because it was adopted to replace another term introduced by its discoverer, and this original name (reduced haematin) has not only priority, but expresses its nature. It was Stokes [1864] who discovered that "brown" alkaline haematin is changed by reducing agents into "red" reduced haematin possessing a characteristic spectrum. Stokes not only discovered the spectrum of reduced haematin, but was also the first to suggest its use for forensic purposes, so characteristic is it, even when the substance is present in minute quantities. It was not until seven years later that Hoppe-Seyler [1871] confirmed Stokes' observation, but gave the substance in question the name of haemochromogen, although he admitted that haemochromogen in alkaline solution is identical with the reduced haematin of Stokes.

The reasons for the adoption of the new term urged by Hoppe-Seyler, are in Gamgee's words [1880]:

"Haemochromogen is a mere product of decomposition of haemoglobin, whilst haematin is an oxidised product of decomposition."

This appears to be a verbal quibble and its justification is entirely lost since even Hoppe-Seyler seems to have dropped his claim of having obtained the substance in crystalline condition directly from haemoglobin [see note by Thierfelder, 1903].

Nearly half a century has elapsed since the introduction of the word haemochromogen, and during this time no evidence has been brought forward to show that reduced haematin and haemochromogen are not one and the same substance. The time has arrived when it is no longer necessary to overburden the nomenclature with a special name. No special name has been found

necessary for reduced haemoglobin; one of us who writes text-books intends in the future to use Stokes' original term, as it is not misleading and expresses the logical relation of the substance to haematin, or, as it will now be necessary to call it, oxy-haematin.

The suggestion is not entirely a new one; Preyer [1871], Linossier [1887], and Abderhalden [1912] have made similar protests.

If this small amendment is made in the nomenclature, we feel sure of its benefit to students, for the relationship of the pigments can then be expressed by the following simple scheme:

As reducing agents the most frequently employed are either ammonium sulphide or ferrous ammonium tartrate, both originally introduced by Stokes [1864]. Both have disadvantages which it is unnecessary to recapitulate here, for they are well known to those who conduct classes of practical physiology. But perhaps the greatest disadvantage they possess is that, unless very carefully applied, the colour change from arterial to venous blood is not convincing to the junior student. We recommend a solution of sodium hydro-sulphite ($\text{Na}_2\text{S}_2\text{O}_4$) as an excellent reducing agent for this purpose. One drop of a 10 per cent. solution is quite sufficient for a test-tube full of dilute oxy-haemoglobin, or oxy-haematin, such as is used in spectroscopic examinations of these substances. The solution itself is colourless, the application of heat is unnecessary, the colour change is immediate and the spectrum is not disturbed by secondary reactions. The employment of this reagent is not new and it seems to have been used about fifty years ago by Schützenberger, its discoverer. He, however, knew the substance only as an unstable solution which had to be prepared from sodium bisulphite by reduction with zinc. The substance is now manufactured on a large scale in this country for the dyeing industry and is obtainable as a dry powder which keeps well. It has the advantage of cheapness over equally satisfactory reducing agents such as hydrazine or hydroxylamine. A 10 per cent. solution of it remains active for many days when kept in a dropping bottle with vaselined stopper.

SUMMARY.

It is suggested that the misleading and unnecessary word haemochromogen be deleted from our vocabulary. Its original name, reduced haematin, should be used instead, and the substance hitherto termed haematin should now be called oxy-haematin.

This would bring the terms into line with reduced and oxy-haemoglobin respectively, and so make the student's work easier in remembering the relationship between blood pigment and its derivatives.

The use of sodium hydrosulphite as a reducing agent is recommended.

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