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# HISTOLOGY OF THE BLOOD

NORMAL AND PATHOLOGICAL

BY

P. EHRLICH AND A. LAZARUS.

EDITED AND TRANSLATED

BY

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WITH A PREFACE

BY

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CAMBRIDGE :  
AT THE UNIVERSITY PRESS.

1900

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UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

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[www.cambridge.org](http://www.cambridge.org)

Information on this title: [www.cambridge.org/9781107450868](http://www.cambridge.org/9781107450868)

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First published 1900

First paperback edition 2014

*A catalogue record for this publication is available from the British Library*

ISBN 978-1-107-45086-8 Paperback

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## PREFACE.

**I**N no department of Pathology has advance been so fitful and interrupted as in that dealing with blood changes in various forms of disease, though none now offers a field that promises such an abundant return for an equal expenditure of time and labour.

Observations of great importance were early made by Wharton Jones, Waller, and Hughes Bennett in this country, and by Virchow and Max Schultze in Germany. Not, however, until the decade ending in 1890 was it realised what a large amount of new work on the corpuscular elements of the blood had been done by Hayem, and by Ehrlich and his pupils. As successive papers were published, especially from German laboratories, it became evident that the systematic study of the blood by various new methods was resulting in the acquisition of a large number of facts bearing on the pathology of the blood; though it was still difficult to localise many of the normal hæmatogenetic processes. The production of the various cells under pathological conditions, where so many new factors are introduced, must necessarily be enshrouded in even greater obscurity

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and could only be accurately determined by patient investigation, a careful arrangement and study of facts, and cautious deduction from accumulated and classified observations.

The pathology of the blood, especially of the corpuscular elements, though one of the most interesting, is certainly one of the most confusing, of all departments of pathology, and to those who have not given almost undivided attention to this subject it is extremely difficult to obtain a comprehensive and accurate view of the blood in disease. It is for this reason that we welcome the present work in its English garb. Professor Ehrlich by his careful and extended observations on the blood has qualified himself to give a bird's-eye view of the subject, such as few if any are capable of offering; and his book now so well translated by Mr Myers must remain one of the classical works on blood in disease and on blood diseases, and in introducing it to English readers Mr Myers makes an important contribution to the accurate study of hæmal pathology in this country.

Comparatively few amongst us are able to make a cytological examination of the blood, whilst fewer still are competent to interpret the results of such an examination. How many of our physicians are in a position to distinguish between a myelogenic leucocythæmia and a lymphatic leukæmia? How many of us could draw correct inferences from the fact that in typhoid fever there may not only be no increase in the number of certain of the white cells of the blood, but an actual leukopenia? How many appreciated the diagnostic

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value of the difference in the cellular elements in the blood in cases of scarlet fever and of measles, and how many have anything more than a general idea as to the significance of a hypoleucocytosis or a hyperleucocytosis in a case of acute pneumonia, or as to the relations of cells of different forms and the percentage quantity of hæmoglobin found in the various types of anæmia ?

One of the most important points indicated in the following pages is that the cellular elements of the blood must be studied as a whole and not as isolated factors, as "it has always been shown that the character of a leukæmic condition is only settled by a concurrence of a large number of single symptoms of which each one is indispensable for the diagnosis, and which taken together are absolutely conclusive." Conditions of experiment can of course be carefully determined, so far, at any rate, as the introduction of substances from outside is concerned, but we must always bear in mind that it is impossible, except in very special cases of disease, to separate the action of the bone-marrow from the action of the lymphatic glands ; still, by careful observation and in special cases, especially when the various organs and parts may be examined after death, information may be gained even on this point. By means of experiment the production of leucocytosis by peptones, the action of micro-organisms on the bone-marrow, the influence of the products of decaying or degenerating epithelial or endothelioid cells, may all be studied in a more or less perfect form ; but, withal, it is only by a study of the numerous conditions under which alterations in the

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cellular elements take place in the blood that any accurate information can be obtained.

Hence for further knowledge of the “structure” and certain functions of the blood we must to a great extent rely upon clinical observation.

Some of the simpler problems have already been flooded with light by those who following in Ehrlich’s footsteps have studied the blood in disease. But many of even greater importance might be cited from the work before us. With the abundant information, the well argued deductions and the carefully drawn up statement here placed before us it may be claimed that we are now in a position to make diagnoses that not long ago were quite beyond our reach, whilst a thorough training of our younger medical men in the methods of blood examination must result in the accumulation of new facts of prime importance both to the pathologist and to the physician.

Both teacher and investigator cannot but feel that they have now at command not only accurate results obtained by careful observation, but the foundation on which the superstructure has been built up—exquisite but simple methods of research. Ehrlich’s methods may be (and have already been) somewhat modified as occasion requires, but the principles of fixation and staining here set forth must for long remain the methods to be utilised in future work. His differential staining, in which he utilised the special affinities that certain cells and parts of cells have for basic, acid and neutral stains, was simply a foreshadowing of his work on the affinity that certain



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cells and tissues have for specific drugs and toxins; the study of these special elective affinities now forms a very wide field of investigation in which numerous workers are already engaged in determining the position and nature of these seats of election for special proteid and other poisons.

The researches of Metschnikoff, of Kanthack and Hardy, of Muir, of Buchanan, and others, are supplementary and complementary to those carried on in the German School, but we may safely say that this work must be looked upon as influencing the study of blood more than any that has yet been published. It is only after a careful study of this book that any idea of the enormous amount of work that has been contributed to hæmatology by Ehrlich and his pupils, and the relatively important part that such a work must play in guiding and encouraging those who are interested in this fascinating subject, can be formed.

The translation appears to have been very carefully made, and the opportunity has been seized to add notes on certain points that have a special bearing on Ehrlich's work, or that have been brought into prominence since the time that the original work was produced. This renders the English edition in certain respects superior even to the original.

G. SIMS WOODHEAD.

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#### NOTE BY THE TRANSLATOR.

**T**HIS translation of the first part of *Die Anæmie*,  
*Nothnagel's Specielle Pathologie und Therapie*,  
vol. VIII. was carried out under the personal guidance  
of Professor Ehrlich. Several alterations and additions  
have been made in the present edition. To my friend  
Dr Cobbett I owe a debt of gratitude for his kind help  
in the revision of the proof-sheets.

W. M.

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