

Color Atlas of Hematology: An Illustrated Field Guide Based on Proficiency Testing, 2nd Edition

By Eric F. Glassy, ed, 480 pp, Northfield, Illinois, College of American Pathologists, 2018.

"The clinical pathologist is an animal of lowly origin and somewhat uncertain parentage."

—J. H. Black, presidential address before the Ninth Annual Convention of the American Society of Clinical Pathologists, Detroit, Michigan, June 20–23, 1930.

The story of proficiency testing goes back to a time when in-hospital laboratories were something new, as was the idea of physicians specializing in clinical pathology. Emerging in the late 19th and early 20th century, the laboratory was considered at best a bit of a luxury, at worst an expensive, space-consuming, and suspicious alternative to some other capital investment. There remained much debate among physicians as to its value, and among clinical pathology's new acolytes, much concern about reputation, remuneration, and, ultimately, viability.^{1–3} Self-doubt is nothing new to our fretful specialty. At that time, questions concerning clinical validity or any influence on outcomes were a distant extravagance; instead, laboratories varied, and clinicians noticed, asking more fundamental questions about analytic accuracy and reliability.^{4,5}

In answer to this, some proposed what may be regarded as a courageous answer, one that would hasten the inevitable confrontation with the question of credibility. It was in Pennsylvania in 1945 that the idea was hatched to distribute serum specimens across the state for inter-laboratory comparisons. Multiple laboratories participated, and the results were dismal.^{6,7} But rather than accepting defeat, what followed was an era of information sharing, with laboratory workshops, seminars, symposia, and the birth of the Col-

lege of American Pathologists' proficiency testing surveys.

Today, proficiency testing is considered an inherent part of quality assurance. It can be a comfort to the medical director, particularly in areas beyond his or her expertise, when performed successfully. Or it can be the first sign that something is amiss. Where objective analytes are concerned, it is easy to review proficiency testing performance with cool detachment. But when our own morphologic impressions are tested, it can feel a little personal. The question boils down to sources of *truth*. Morphologic surveys are adjudicated by prevailing majorities, which, to those in the minority, can seem capricious and vaguely persecutory were we not reminded that proficiency testing is essentially anonymous, independent, and noncollaborative in all aspects. In its tedious completion it is not always obvious that a form of essential truth is being approximated in perhaps the only manner available.

In his book *The Wisdom of Crowds*, James Surowiecki⁸ puts forth the following argument. The average of a group of opinions, *if each is independently rendered*, is better than any single opinion, even when the group includes experts. This assertion appears at first to defy the *madness of crowds* notion, but it does not; crowds are entirely capable of madness, it says, but are not obliged to go mad. The difference between groups that behave wisely and those that do not is the degree to which thoughts are independent. Expert committees, consensus conferences, boards, and ballots are constructs prone to the corrupting influence of interdependence, to which they will succumb if not properly managed.

In the foregoing resides the unique strength of *The Color Atlas of Hematology*, based as it is on decades of proficiency testing. The experience of the proficiency testing survey, for the surveyor, provides insight into areas of difficulty that may not have been anticipated, providing an impetus for elucidating particularly difficult distinctions. An atlas might have achieved equal breadth, depth, and visual beauty without it, but proficiency testing provides a kind of awareness, intuitive to only the most insightful and empathic teachers, of where the student might be stuck.

The aim of the book, as Dr Glassy expresses in the preface to the 1st edition, is to make better morphologists of us. Examples gathered from proficiency testing surveys are presented with consensus identifications, explanations, supplementary images, illustrations, and QR codes linking to virtual slides. The book is not intended to be exhaustive, but it achieves a consistent level of depth. It does this by way of repetitive structure, with each cell challenge presented in the same way. First is a compact list of key features, look-alikes, and associated diseases. This is followed by a brief prosaic section that fleshes out particular items, as needed. Next are illustrations of key features. Last, there is a series of images; some of these are taken from actual surveys and presented alongside the referee and participant data, whereas others are meant to supplement these and are presented with captions. Based upon proficiency testing responses and, probably, their own experience, the authors are able to anticipate mental snags. These are discussed in one of the foregoing sections or in thoughtful "A Closer Look At" pieces that accompany many of the sections.

The QR codes worked flawlessly, on both iPhone and PC, opening virtual slides that allow one to look around at length and capture additional images if needed. The printed images are crisp and vibrant, reprinted on high-quality paper, and of sufficient magnification and annotation that things are made clear. The illustrations are well conceived and efficient, providing as sometimes only an illustration can, a key to unlocking the images that follow. And they are beautiful, depicting with great fidelity the frustratingly indescribable qualities—the colors, textures, bends, and bumps—that give distinctiveness to a cell. The illustrations are, amazingly, entirely the work of the senior editor, Dr Glassy.

The introductory chapter covers the history of hematology, the approach, primary techniques, and ancillary techniques. This chapter alone might warrant the purchase price and provides a flavor of the combined textual and visual devices that follow. The section on history contains vivid reproductions of original sources; touches the key

events, albeit briefly; and offers hope that names like Coulter, Downey, and Diamond will not soon be forgotten. Next it provides an illustrated survey of methods in hematology, from smear preparation to microarray, presented in a way that can serve as both review and introduction. The book is thereafter organized according to cell type, with separate chapters devoted to miscellaneous items, microbes, and artifacts. The space devoted to each section is fairly even, aside from some especially significant topics (notably, reactive lymphocytes) that are expansive in rough proportion to the amount of confusion they entail—a sort of homunculus of vexation. It concludes with an appendix briefly discussing proficiency testing and providing many more virtual blood smears. Both the index and table of contents provide efficient navigation.

Publication coincided with the release of the World Health Organization (WHO) 2016 classification, such that all references to distinct neoplasms are made in the context of WHO 2008. This presents a slight difficulty of apperception, which is an

echelon removed from the book's core focus. The book is multiauthored but successfully avoids the patchiness that often afflicts such work, either because of the regimented style, the editor, or both. A more extensive section devoted to the many faces of circulating blasts, something like the excellent treatment given to reactive lymphocytes, might have been valuable.

In comparison with the 1st edition, most changes reflect the passage of time. For example, the 1st edition contained a table outlining the French-American-British classification for acute leukemia, and the 2nd edition is much more circumspect on the question of bands versus segmented neutrophils. Most striking in comparing the 2 editions is a mammoth collection of new images and illustrations, so much so that the book has been divided into 2 volumes, one covering peripheral blood and the other on marrow.

The *Color Atlas of Hematology* is one of those books that stays on your desk most of the time and is rarely shelved for long. I recommend this book to anyone who looks at blood smears, and I recommend 2 to those who teach.

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1. Horder L. The role of clinical pathology in medicine. *Am J Clin Pathol.* 1937;6(6):521–528.
2. Simpson WM. The clinical pathologist as consultant and teacher. *Am J Clin Pathol.* 1933;3(5):327–332.
3. Reisman D. Relations and functions of the clinical pathologist in the hospital staff. *Am J Clin Pathol.* 1931;2(1):1–6.
4. Mahoney FX. The reporting of typhoid fever. *Boston Med Surg J.* 1922;187(9):345–348.
5. Rohdenburg GL, Garbat AL, Spiegel L, Manheims PJ. The Wassermann test and its limitations in diagnosis and treatment. *JAMA.* 1921;76(1):14–16.
6. Sunderman FW. Twenty-five years of proficiency testing for clinical laboratories. *Ann Clin Lab Sci.* 1972;2:420–424.
7. Belk WP, Sunderman FW. A survey of the accuracy of chemical analyses in clinical laboratories. *Am J Clin Pathol.* 1947;17(11):853–861.
8. Surowiecki J. *The Wisdom of Crowds.* New York, NY: Anchor Books; 2005.

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