

# The Art & Science of Cytopathology

2nd Edition

(in 4 volumes)



*"By God, for a minute there it suddenly all made sense!"*

To Chuck, with love and respect

# The Art & Science of Cytopathology

2nd Edition

## References and Master Index

(Volume 4 of 4)

Richard Mac DeMay, MD  
Professor of Pathology  
Director of Cytopathology  
University of Chicago



American Society for Clinical Pathology  
Chicago

## Acknowledgements

First and foremost, I want to acknowledge the Herculean (at times no doubt Sisyphean) effort of Joan Hives in doing the library research and bibliographic preparation work for this book. I am also grateful for her many personal kindnesses to me. Unfortunately, due to illness, Joan was unable to completely finish this immense task, but did well more than 90% of the total.

I thank my valiant wife, Valerie, who stepped up late in the going to help finish the bibliography. Even *just* 10% of 25,000 references is way more than you can shake a stick at...and probably adds to the “worse” side of that marriage vow.

I also want to acknowledge my long-time colleagues, Ann Marie Maslan (now retired) and Ward Reeves (of the famous and eponymous WARD cells) for their tremendous help and support over many years.

I am also lucky to have many other wonderful colleagues at the University of Chicago, including Thomas Krausz, Jeffrey Mueller, and Tatjana Antic, as well as Ghazal Khan, Patsy Lin, Sean Macleish, Rebecca Danahey, Phuong Lang, Raephaele Masirnille, and Minerva Torres.

In the course of the past 2 decades of work on this enterprise, many people have extended help with expertise and useful criticisms. But I have to extend special thanks to all who contributed a slide or photomicrograph in the amassing of those 50 thousand images from which we chose the final set. Important contributions of advice, time and/or materials came from Jerome Taxy, James Vardiman, Syed Ali, Lawrence Ash, Bernard Naylor, William Johnston, Karen Honeycutt via James Linder, Francis Chandler, John Watts, Jan Silverman, Blair Holladay, Marshall Austin, Kent Nowels, Jami Walloch, Elizabeth Sengupta, Fred Worsham, and Greg Spiegel.

Again, I thank Hector Battifora, Denise deFrias, and Jack Frible, 3 of my best teachers for sharing their knowledge and inspiring me to devote so much of my life's blood to cytopathology.

Last, but certainly not least, I thank Joshua Weikersheimer of ASCP, my friend and co-conspirator in the *Art & Science of Cytopathology* and all my other books. Once a man of taste and patience, he is now probably just a man of taste.

All of you have my deep appreciation and warm personal regards.

## Publishing Team

Erik & Lisa Tanck (design/production)

Cristina Lazar (color consultant)

Jeffrey Link (production)

Aimee Algas (editorial/proofreading)

Joshua Weikersheimer (publishing direction)

## Notice

Trade names for equipment and supplies described are included as suggestions only. In no way does their inclusion constitute an endorsement of preference by the Author or the ASCP. The Author and ASCP urge all readers to read and follow all manufacturers' instructions and package insert warnings concerning the proper and safe use of products. The American Society for Clinical Pathology, having exercised appropriate and reasonable effort to research material current as of publication date, does not assume any liability for any loss or damage caused by errors and omissions in this publication. Readers must assume responsibility for complete and thorough research of any hazardous conditions they encounter, as this publication is not intended to be all-inclusive, and recommendations and regulations change over time.



American Society for  
Clinical Pathology  
Press

Copyright © 2012 by the American Society for Clinical Pathology. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the publisher.

Printed in Hong Kong

16 15 14 13 12

# Table of Contents: Volume 4—References and Master Index

References by Chapter	Master Index
ix	ix1
1: The Pap Test	1638
2: Respiratory Cytology	1699
3: Fluids	1712
4: Gastrointesintal Tract	1738
5: Urine	1751
6: Cerebrospinal Fluid	1765
7: Fine Needle Aspiration	1771
8: Building Blocks of Cytopathology & 8-1/2: Where's the Primary?	1790
9: Soft Tissue, Bone and Skin	1805
10: Head & Neck	1830
11: Salivary Gland	1835
12: Thyroid	1846
13: Lymph Node	1882
14: Breast	1900
15: Pleura	1932
16: Lung	1934
17: Mediastinum	1951
18: Liver	1957
19: Pancreas	1974
20: Kidney	1985
21: Adrenal	1994
22: Gonads	1999
23: Central Nervous System	2005
24: Bugs	2007
26: Stains	2008
27: Molecular Cytopathology	2016
28: The Laboratory	2017
30: Statistics	2018
π: History	2019



*Omne tulit punctum qui miscuit utile dulci, lectorem delectando pariterque monendo*

—Horace, from the *Ars Poetica*

In other words, a spoonful of sugar helps the medicine go down. That was the watchword for the first edition of the *Art & Science of Cytopathology*, and the tradition continues in this completely revised and rewritten new second edition. *Useful* knowledge is still best assimilated when rendered *sweet* to the reader. So we have tried to find ways to *delight* and *instruct* the reader simultaneously. The features that made the original edition of the *Art & Science* useful and sweet are still here (and in even more droves): thousands of images, hundreds of summary lists (MaxFax), and scores of tables, including image-based tables that couple morphologic descriptions with real microscopic appearances. The microscopic imaging ranges from scanning to oil immersion magnifications, revealing diagnostic detail in Papanicolaou and Romanowsky stains, along with immunocytochemical, liquid-based, molecular, and special stain preparations as most useful. As before, each diagnostic chapter features a synoptic atlas of large images that are carefully chosen and described to facilitate quick review (perhaps for board exams?).

The 4 volumes are arranged by general topic. Volume 1 is Exfoliative Cytology, Volume 2 is Superficial Aspiration Cytology, and Volume 3 is Deep Aspiration Cytology. Volume 3 also includes an Excursus from pure cytodiagnostics comprising chapters on microbiology, the cell, stains, the microscope, statistics, and history of cytology—as well as new contributed chapters on lab operations and regulation, and molecular cytopathology. Finally, we've created a supportive Volume 4 in which are found the references for all of the chapters—over 25,000 of them—together with a master comprehensive index that complements the volume-specific indices found in the other 3 volumes. So you have an extraordinarily comprehensive bibliography of cytopathology, yet you only have to handle it when you specifically need the full citations.

So what's new in the 15 years since the first edition's debut? Well, the digested contents of over 15,000 new articles selected—about 1,000 per year—that have been published since the release of the original edition. That's a lot of new information. Classification schema have changed over the years, taking an increasingly molecular turn. The text reflects the twistings and turnings of various classification systems, such as the Bethesda systems, the 2008 WHO hematologic classification, and—hot on the presses—the latest diagnostic system for carcinoma formerly classified as bronchioloalveolar carcinoma. But the book is careful to relate well-established approaches to diagnosis and widely used nomenclature with the most current proposed schemes—nothing useful and familiar is discarded simply because it is not strictly *au courant*.

All of the photomicrographs retained from the first edition were reimaged to take advantage of new digital imaging techniques. In addition, new images were chosen from over 50,000 new

photomicrographs to fill gaps, increase the degree of variation that could be displayed, and to show some exotics that have rarely been seen in textbooks of cytopathology before now. We've also modified materials and design to make each volume easier to handle and a little less heavy, and yet more image- and information-packed page after page than the original edition (7,000 images alone!).

But we haven't lost track of the art amidst all that new science. Indeed, the *art* in *The Art & Science* has inspired others over the years to see opportunities for their own art in science. The frontispieces of each of the first 3 volumes display some of the work of Henry Li, who combines a little Chinese brushwork with photomicrography. We are gratified to see how this work has touched so many others around the world.

We hope that this new edition will continue to be a practical storehouse of information for everyday problems that is also a pleasure to use, and that it will enhance the art & science of your ongoing cytologic practice. *Let us advance knowledge so that life may be enriched.*

Mac DeMay  
Joshua Weikersheimer

---

#### Mac begins writing (c 1958 CE) with Laurie advising

