

**STUDENT'S HISTOLOGY; A
COURSE OF NORMAL
HISTOLOGY FOR STUDENT'S AND
PRACTITIONERS OF MEDICINE**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649121298

Student's histology; a course of normal histology for student's and practitioners of medicine by
Maurice N. Miller & Herbert U. Williams

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

MAURICE N. MILLER & HERBERT U. WILLIAMS

**STUDENT'S HISTOLOGY; A
COURSE OF NORMAL
HISTOLOGY FOR STUDENT'S AND
PRACTITIONERS OF MEDICINE**

STUDENTS HISTOLOGY

*A COURSE OF NORMAL HISTOLOGY
FOR STUDENTS AND
PRACTITIONERS OF MEDICINE*

BY

MAURICE N. MILLER, M.D.

*Late Director of the Department of Normal Histology in Leomin' Laboratory,
University of the City of New York*

REVISED BY

HERBERT U. WILLIAMS, M.D.

*Professor of Pathology and Bacteriology, Medical Department,
University of Buffalo*

**THIRD REVISED EDITION
PROFUSELY ILLUSTRATED**

NEW YORK

WILLIAM WOOD & COMPANY

1898

UNIV OF CALIF
MEDICAL SCHOOL

COPYRIGHT BY
WILLIAM WOOD & COMPANY
1898

Hunts Pleasant Printery
J. Horace McFarland Company
Harrisburg, Pa.

UNIVERSITY OF CALIF.
MEDICAL SCHOOL

QM551

M64W

1898

PREFACE

This volume has been prepared with a view of aiding the instructors and students of the laboratory classes which are under my direction.

It is also presented with the hope that it may be useful to other instructors.

Again, students often wish to continue microscopical work during the interim of college attendance; to such, it is my belief, these pages will have some value.

Still again, very many practitioners, not having had, during pupilage, advantages equal to those provided by the modern laboratory equipment, wish to acquire more knowledge of microscopy, for its value in practical medicine. To such workers, also, I desire to be useful.

So much technique has been introduced as has been found to be of absolute necessity, and no more. The processes for the preparation and exhibition of tissues are generally simple and always practicable.

In the description of organs, I assume that the student has a fair knowledge of gross anatomy, but knows nothing of histology. The scheme or plan of the structure is first described—using diagrams where requisite to clearness—after which the mode of preparing the sections is indicated, and, under practical demonstration, every histological detail tabulated in proper order. The drawings will, I believe, aid in the recognition of such elements in the field of the microscope.

The illustrations are exact reproductions, by photography, of my own pen-pictures; and distinction must always be made between the drawings which are schematic—used to emphasize

13475

the plan of structures—and those drawn from the tissue as seen in the microscope.

Our literature abounds in excellent works for the advanced student, and this volume is designed to pave the way for their appreciation.

I desire to record my high appreciation of the aid of Drs. Charles T. Jewett, Egbert Le Fevre, E. Eliot Harris, Milton Turnure, H. Pereira Mendes, J. Gorman, A. M. Lesser, J. Alexander Moore, Robert Roberts, Esq., Warden, and Mr. John Burns, Clerk of Charity Hospital, in facilitating my access to valuable tissue for the illustrations and for my own studies.

My thanks are due my First Assistant, Dr. F. T. Reyling, for his indefatigable efforts in furthering the work; and to Mr. A. J. Drummond, for photographic favors.

MAURICE N. MILLER.

NEW YORK, June 1st, 1887.

PREFACE TO THIRD REVISED EDITION

A revision of Miller's *Microscopy* became necessary, partly on account of the advances made in histology during the last ten years, and partly because of the increasing tendency in medical schools to devote more time to laboratory studies. Substantially all of the original matter has been retained, although somewhat rearranged; and where new matter has been inserted, the attempt has been made to give it the form which was the peculiarity of the original, namely, in being written from the point of view of the student, and not of the teacher. In preparing the various additions, the standard text-books on histology have been constantly consulted.

BUFFALO, N. Y., August, 1898.

CONTENTS

PART FIRST

TECHNOLOGY

THE LABORATORY MICROSCOPE

	PAGE
Description of the Stand	1
Lenses	2
General Adjustment	4
Adjustment for Illumination	4
Adjustment for Focus	5
Method in Observation	6
Conservation of the Eyesight	7
Magnifying Power	7
Measurement of Objects	8
Sketching from the Instrument	9

PREPARATION OF TISSUES FOR MICROSCOPICAL PURPOSES

Teasing of Tissues	9
Section Cutting	10
Free-hand Section Cutting	10
Section Cutting with the Stirling Microtome	12
Section Cutting with the Larger Microtomes	15
Sharpening Knives—Honing and Stropping	16
Supporting Tissues for Cutting	18
Paraffin Soldering	18
The Freezing Microtome	19
Fixing or Hardening Fluids	20
Alcohol Hardening	21
Müller's Fluid	22
Orth's Fluid	22
Formaldehyde	22
Pierie Alcohol	23
Osmic Acid	23
Flemming's Solution	23
Chromic Acid	24
Erlieki's Fluid	24

	PAGE
Decalcifying Fluid	24
Dissociating Fluid	25
Imbedding—Paraffin	25
" —Celloidin	26
Staining Methods in General	27
Hæmatoxylin	28
Eosin	28
Carmine	29
Weigert-Pal Method	30
Aniline Dyes	31
Van Gieson's Stain	32
Ehrlich Tricolor Stain	32
Metallic Impregnations—Nitrate of Silver	33
Golgi's Method	33
Injection Methods	34
Clearing Agents	35
Mounting Media	35
Hæmatoxylin Staining Process	36
Hæmatoxylin and Eosin Double Staining	38
Borax-Carmine Staining Process	39
Cleaning Slides and Cover-glasses	41
Mounting Methods	41
Labeling Slides	42
Care of the Microscope	43

PART SECOND

STRUCTURAL ELEMENTS

PRELIMINARY STUDY

Form of Objects	45
Movement of Objects	46
Extraneous Substances	47

STRUCTURAL ELEMENTS

Cells	49
Cell Distribution	50
Cell Division—Karyokinesis	51
Classification of Tissues	53
Embryonic Derivation of Tissues	54
Epithelium	54
Distribution of Epithelium	55
Squamous, Stratified, and Transitional Epithelium	55
Pavement Epithelium	56
Columnar Epithelium	57
Ciliated Columnar Epithelium	58

CONTENTS

vii

	PAGE
Glandular Epithelium	59
Endothelium—Serous Membranes	60

CONNECTIVE (FIBROUS) TISSUES

White Fibrous Tissue	62
Yellow Elastic Tissue	63
Adipose Tissue	65

CARTILAGE

Hyaline Cartilage	67
White Fibro-Cartilage	68
Elastic Cartilage	68

BONE

Bone	70
Periosteum	73
Marrow	73
Development of Bone	73

SPECIAL CONNECTIVE TISSUES (page 76)

MUSCULAR TISSUE

Non-striated Muscle	76
Striated Muscle	78
Cardiac Muscle	80

BLOOD

Red Corpuscles	81
Blood-plates	82
White Corpuscles	83
Enumeration of Blood-corpuscles	87
Hæmoglobin	89
Fibrin	90
Effect of Reagents	90
Development of Red Blood-corpuscles	91

PART THIRD

ORGANS

THE SKIN

Layers or Strata	92
Hairs	95
Sudoriferous Glands	97