NOTES ON MICROSCOPICAL METHODS FOR THE USE OF LABORATORY STUDENTS IN THE ANATOMICAL DEPARTMENT OF THE CORNELL UNIVERSITY

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Notes on microscopical methods for the use of Laboratory Students in the Anatomical Department of the Cornell University by Simon H. Gage

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SIMON H. GAGE

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—ON—

MICROSCOPICAL METHODS

FOR THE USE OF LABORATORY STUDENTS IN THE ANATOMICAL DEPARTMENT OF THE

CORNELL UNIVERSITY,

—BY—

SIMON H. GAGE.

ASSISTANT PROFESSOR OF PHYSIOLOGY AND LECTURER ON MICROSCOPICAL TECHNOLOGY.

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PREFATORY NOTE.

The following notes on microscopical methods take the place of those published in 1881. They are designed to accompany the Notes on Histological Methods printed last year, and to give only the main facts and principles relating to the microscope and to its manipulation which seem to the writer indispensable for the successful study of elementary histology.

SIMON H. GAGE,
Anatomical Laboratory of Cornell University.

JANUARY, 1887.

TOPICS.

The microscope and its parts—Care and use.—A microscope. A simple microscope. A compound microscope. Optical parts of a compound microscope. Mechanical parts (Fig. 3). Reflected light. Transmitted light. Central and oblique light. Lighting. Use of diaphragms and shading the object. Putting the objective in position and removing it. Function of the objective. Nomenclature of objectives. Putting the ocular in position and removing it. Function of an ocular. Nomenclature of oculars. Focusing. Working distance. Focusing with low objectives, with high objectives. Field of a microscope. Putting an object under the microscope. Care of a microscope,—the mechanical parts, the optical parts. Care of the eyes. (§§ 1–26, pp. 1–9; Figs. 1–4).

2. **Interpretation of appearances under the microscope.**—Dust or cloudiness on the ocular, on the objective. Relative position of objects or parts of the same object. Objects having irregular outlines. Transparent objects having curved outlines. Air bubbles. Oil globules. Distinctness of outline. Highly refractive. Doubly contoured. Optical section. Currents in liquids. Pedesis or Brownian movement. Demonstration of pedesis with the polarizing microscope. (§§ 27–45, pp. 9–14; Figs. 2, 4, 5).

3. **Magnification—ocular micrometer ratio.**—Magnification, expressed in diameters. Distance at which the image is measured.

Magnification of a simple microscope. Stage micrometer. Magnification of a compound microscope. Varying the magnification of a compound microscope. Ocular micrometer. Ocular micrometer ratio. Magnification of the objective, positive and negative oculars (note to § 57). Varying the ocular micrometer ratio. Table of magnifications and ocular micrometer ratios to be filled out by each student. (§§ 46–59, pp. 14–18; Figs. 1, 2, and 6).

4. **Micrometry and drawing.**—Micrometry with a simple microscope. Unit of measure in micrometry. Micrometry with a compound microscope, three methods. General remarks on micrometry. Drawing. Camera lucida. Camera lucidas that reflect the microscopic image—those that reflect the image of the drawing paper. Avoidance of distortion in using a camera lucida. Drawing with a camera lucida. (§§ 60–69, pp. 18–23; Figs. 6–8).

5. **Adjustable and immersion objectives, etc.**—Adjustable and non-adjustable objectives. Tube length. Dry and immersion objectives. Apochromatic objectives. Illuminators. (§§ 70–77, Figs. 9–11, pp. 24–29).

6. **Appendix.**—Imbedding in celloidin. Cutting, fixing and clearing celloidin sections. Counting white blood-corpuscles. Stronger cleaning mixture for glass. Cleaning large cover-glasses. Supplemental bibliography. (§§ 78–84, pp. 30–32).