WORLD'S COLUMBIAN EXPOSITION,
CHICAGO, ILLS., 1892-'93.

WAR DEPARTMENT EXHIBITS.
MEDICAL DEPARTMENT UNITED STATES ARMY.

No. 5.

DESCRIPTION
OF
MICROSCOPES
FROM THE
ARMY MEDICAL MUSEUM, WASHINGTON, D. C.

BY
SURGEON JOHN S. BILLINGS, U. S. ARMY,
CURATOR OF MUSEUM.

BY DIRECTION OF THE SURGEON-GENERAL.

LOUIS A. LA GARDE,
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Description of the Microscopes

FROM THE

ARMY MEDICAL MUSEUM, WASHINGTON, D. C.

BY SURGEON JOHN S. BILLINGS, U. S. A.,
CURATOR OF THE MUSEUM.

The microscopes exhibited by the Army Medical Department are part of a collection which has been formed at the Army Medical Museum to illustrate the successive stages of development of the instrument, and of the various appliances connected with it, both optical and mechanical. The majority of the instruments exhibited are of foreign make, and it is desired to obtain specimens of old instruments from American makers to show what has been done in this direction in this country.

MICROSCOPES FROM THE ARMY MEDICAL MUSEUM.

1. Copy of the microscope of Hans Jansens, or Janssen, a spectacle-maker of Middleburg, Holland. About 1591. The first compound microscope made, consisting of two convex lenses connected by tubes roughly soldered and turned inside. This copy was made after the original at the instance of John Mayall, Jr., in 1891. Spec. 114, Misc. Sec.

2. A compound microscope by Giuseppe Campani; the body-tube—with screw draw-tube carrying the eye lens—of ivory, screwing into a ring socket of horn, mounted within a silver ring connected with three silver scroll legs attached to ebony base, triangular in shape, with concave sides. There is an ivory rotating stage in the centre of the base. The name appears on the silver ring. A beautiful example of an early microscope, antedating, probably, Hooke's, because it has no field lens to the ocular. About 1650. Spec. 792, Misc. Sec.

3. Culpeper's vertical tripod microscope; fish-skin covered body socket. About 1740. Spec. 139, Misc. Sec.

4. Very old solar microscope, with heliostat mirror and Wilson's "simple," with six powers (probably dating soon after 1740), plane glass and long focus lens fitting in heliostat (for experiments on light), troughs, with four concave cells, two milled-head screws, and two plates for attaching heliostat. Spec. 108, Misc. Sec.

5. Jones's solar microscope (very good example), with sliding lens; Nos. 1, 2, 3, and 4, and long slide of six lenses; forceps, two milled-head screws, and two plates for attaching heliostat. About 1750. Spec. 109, Misc. Sec.

6. Ellis's aquatic microscope with Wilson's combined. Two Lieberkühns; three simple lenses, trough, three slides of objects, box of talc covers, and part of stage forceps. About middle of eighteenth century. Spec. 105, Misc. Sec.

7. Old compound microscope, by J. Cuff; sliding Lieberkühn; stage forceps; mirror; six lenses; eyepiece screws in; fish plate; animalcule stage; black and white disk; glass cell; two diaphragms for mirror. Set diagonally on wood tablet with drawer. Spec. 102, Misc. Sec.

8. Old compound microscope, by Dollond, with rotating disk of lenses at nose-piece; disk of diaphragms; folding feet; compound eye-len to eyepiece; live-box; mirror with plaster plane. About 1757. Spec. 112, Misc. Sec.

9. Jones's improved aquatic microscope. Two Lieberkühns; three simple lenses; cloth-covered stage and ordinary stage; animalcule trough. About 1770. Spec. 106, Misc. Sec.

10. Very old "Dellebarre," simple and compound; two Lieberkühns with lenses; spring stage; fish plate; trough; stage forceps; forceps; four slides of objects; screw for fixing microscope on tree, etc.; box of talc covers; carrier for compound body; carrier for simple lenses; two diaphragms; flat and concave glass stage plates. About 1770. Spec. 113, Misc. Sec.

11. Small portable botanical microscope, made by W. & S. Jones, Holborn, London. Fine adjustment at back; one Lieberkühn; one high power; three lateral swinging lenses in cells; live-box; stage forceps; three slides of objects. Latter part of eighteenth century. Spec. 110, Misc. Sec.

12. Brock's portable compound microscope, with four lenses; screwed on box. About 1800. Spec. 107, Misc. Sec.

13. Harris's portable "opaque" microscope, in case; three Lieberkühns with lenses; one simple lens; forceps; trough; object-holders. About 1820. Spec. 111, Misc. Sec.

14. Dollond's simple and compound microscope. Pillar on folding tripod base; inclining cradle-joint top of pillar. Square section limb carrying sliding bar at top for simple lens and compound body; stage clip on two rods; extra stage on pivot carrying large glass. White and black ivory disk. Stage condenser on gimbal and pivot arm; diaphragm (coned); live box; simple lens; high power; disk of six lenses on revolving nose-piece; two lenses with Lieberkühns; separate Lieberkühn on rod; frog plate; ivory box of talc disks and brass rings for objects; brass slide with four glass concave disks for wet objects; micrometer ruled on glass; stage micrometer; compound body with eyepiece. About 1825. Spec. 168, Misc. Sec.

15. Microscope, by Carpenter & Westley. Very early model issued by the firm. Rack-moving stage (coarse adjustment), fine adjustment top of limb as in Oberhauser's; one eyepiece; disk of diaphragms; spring stage; stage condenser. About 1835. Spec. 104, Misc. Sec.

16. Smaller "Andrew Ross & Co." (No. 65). Early type of "Ross" continued by Ross till after the death of T. Ross. Eyepiece; disk of diaphragms sliding in movable plate beneath stage; straight arm sliding on tail-piece to carry dark wells; two dark wells; polarizer fitting beneath stage in moving plate; analyzer fits over eyepiece. 1830 to 1840. Spec. 101, Misc. Sec.

17. Large old "Andrew Ross & Co.," with fine adjustment acting at back of limb. Hinged heel-piece to foot. Polarizer screwing on bent arm sliding on tail-piece. Analyzer fitting over eyepiece; dark well on stem fitting on bent arm on tail-piece; disk of diaphragms fitting beneath stage with short cylindrical tube. About 1840. Spec. 99, Misc. Sec.

18. Large old "Andrew Ross & Co." microscope; body-tube worked by rack on limb extending nearly the whole length at the back; focusing in front of body-tube at nose-piece; double nose-piece; achromatic condenser with centering screws and rack-work, fitting beneath stage by three projections corresponding to slots in the flange of condenser; polarizer; analyzer fitting in adapter at lower end of draw-tube. About 1843. Spec. 100, Misc. Sec.

19. J. L. Riddell's binocular microscope in which "behind the objective, and as near thereto as practicable, the light is equally divided and bent at right angles, and made to travel in opposite directions by

means of two rectangular prisms;" made in 1852 by Grunow Brothers, New Haven, Connecticut. Spec. 117, Misc. Sec.

20. Binocular inverted microscope of J. and W. Grunow, New York; made with two prisms only, modified from the earlier plan of Riddell; two sets of eyepieces; 1, $\frac{1}{4}$ and $\frac{1}{2}$ objectives; achromatic condenser; reflecting prism instead of mirror; a modification of H. L. Smith's illuminator for opaque objects. 1854. Spec. 118, Misc. Sec.

22. Baker's travelling microscope devised by Moginie. Body slides in a tube attached to a stem which carries at its lower end a small stage and mirror; a fine adjustment is worked by a milled head-screw at its summit, and near to this is attached a pair of legs which form with the stem a firm tripod support. About 1860. Spec. 116, Misc. Sec.

23. Large monocular microscope made by Joseph Zentmayer, of Philadelphia, Pennsylvania. Spec. 120, Misc. Sec.

24. Student microscope made by Joseph Zentmayer, of Philadelphia, Pennsylvania. 1876. Spec. 119, Misc. Sec.

25. Inverted chemical microscope constructed by Nachet et Fils, Paris, on a plan devised by Dr. J. Lawrence Smith, of Louisiana, for the purpose of viewing objects from their under side when heat or reagents are applied to them. Spec. 122, Misc. Sec.