DENDROLOGY WOOD ANATOMY LAB I

I. Obtain a compound light microscope and learn how to establish Kohler illumination. This procedure, named after August Kohler who developed the theory and procedure in 1894, should be preliminary to each exercise involving the compound light microscope in order to optimize resolution and avoid eye strain.

1. Make sure a) ocular, b) objective, and c) condenser lenses are clean.

2. Put the 10X objective in the viewing position.

3. Adjust interpupillary distance of oculars.

4. Place a prepared slide on the microscope stage.

5. Bring the image of the prepared slide into sharp focus.

6. Open condenser iris diaphragm.

7. Close the lamp (field) diaphragm. (Put the fake lamp diaphragm over half the lamp housing.)

8. Focus the small octagon image of the lamp diaphragm using the condenser focus knob. (Focus the image of the edge of the fake lamp diaphragm.)

9. Open the lamp diaphragm until almost the entire image field is illuminated. (Remove the fake lamp diaphragm.)

10. For newer microscopes: Set condenser diaphragm to match either the objective or numerical aperture of the objective you are using.

10. For older microscopes: Remove one ocular. Peer down the ocular tube and adjust the condenser diaphragm so that ca. 80% of the objective lens is illuminated.. Replace ocular.

11. Adjust the lamp voltage control for comfortable viewing.

NOTE: When the objective lens is changed it is necessary to adjust the condenser diaphragm to match the objective you are using as in step 10. You will use small strips of time tape to mark the appropriate condenser diaphragm positions to facilitate these adjustments on older microscopes. Also use a piece of time tape to place your initials on the microscope you will be using each laboratory
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II. Make freehand transverse sections midway between successive bud scale scars on one of the three year angiosperm twigs you collected. Examine these sections in developmental sequence using a binocular dissecting microscope. Note the transverse relationships between successive annual growth rings in each section. Identify as many tissues as you can in your sections.

III. Study in chronological sequence the prepared light microscope cross sections of the 1, 2, and 3 year old Tilia stems. Relate your observations to what you observed in your freehand sections. Identify: annual rings, pith, primary and secondary xylem, ray parenchyma, cambium, primary and secondary phloem, dilated ray parenchyma, cortex, phellum (cork), phellogen (cork cambium), phelloderm. Note if there are any lenticels present.

IV. Make a freehand longitudinal section of the other angiosperm twig you collected. Section through the pith throughout three years of stem growth. Examine your section using a binocular dissecting microscope. Note the longitudinal relationships between the successive annual growth rings. Relate these to your observations on the transverse sections.