

3.4 Splitting and sectioning charcoal or mineralized wood

When a small sample of charcoal has to be identified it is best to simply break it (Fig. 3.16). The structure of the cross sectional plane is perfect for episcopic observation. For radial and tangential sections, the sample can be split using a knife (Fig. 3.17).

This same procedure is also useful for mineralized wood, which often occurs along metallic archeological artifacts, e.g., scabbards. Anatomical details in the transverse and longitudinal planes become distinct if all dust particles are blown out with compressed air (Figs. 3.18 and 3.19)



Fig. 3.16. Breaking charcoal across the fiber between fingers.



Fig. 3.17. Splitting charcoal parallel to the fiber with a knife.

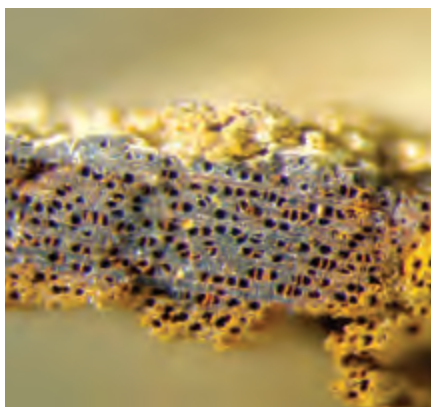


Fig. 3.18. A broken piece of mineralized wood, transverse surface of *Alnus* sp. Photo: Willy Tegel.

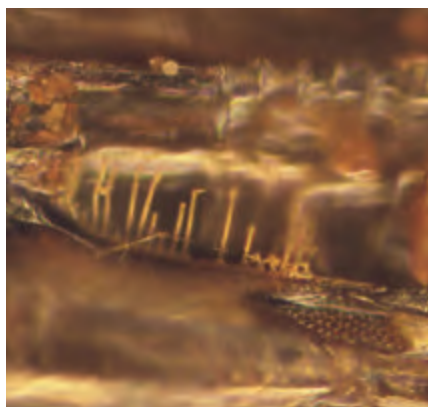


Fig. 3.19. A split piece of mineralized wood, radial surface of *Alnus* sp. with scalariform perforations. Photo: Willy Tegel.

To prepare microscopic cross sections which are useful for photographic presentation, apply a drop of a mixture of a two-component adhesive, e.g., Araldit, on the transverse side of a broken charcoal surface (Fig. 3.20). The liquid fill all cavities and polymerizes within 30 minutes, after which the surface can be planed with a normal microtome (Fig. 3.21).

In the next step, a small piece of transparent self-adhesive tape (e.g., Scotch tape) is attached to the top surface (Fig. 3.22). The microtome knife is pulled through the charcoal at a sharp angle and a thickness setting of 20–30 microns. The section adheres to the tape and can be mounted onto a slide (Fig. 3.22). At this point, the section is ready for microscopic observations (Fig. 3.23). By using a mounting medium, e.g. Canada balsam, the slide remains permanent, but the adhesive tape has to be kept intact to preserve the integrity of the charcoal section. This procedure stabilizes the fragile carbonized structures. This procedure does not work for longitudinal sections because the fragile carbonized structures split within the adhesive (Fig. 3.24) (Schweingruber 2012).



Fig. 3.20. Two-component adhesive.



Fig. 3.21. Flat transverse cut through a piece of charcoal, which is stabilized with a two-component adhesive.



Fig. 3.22. Charcoal stabilized with a two-component adhesive, covered with an adhesive tape in a microtome holder. The knife cuts the charcoal and the section remains intact by adhering to the transparent tape.

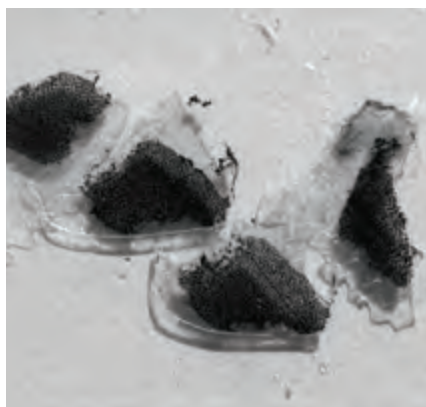


Fig. 3.23. Microscopic cross-sections adhering to adhesive tape on a slide.

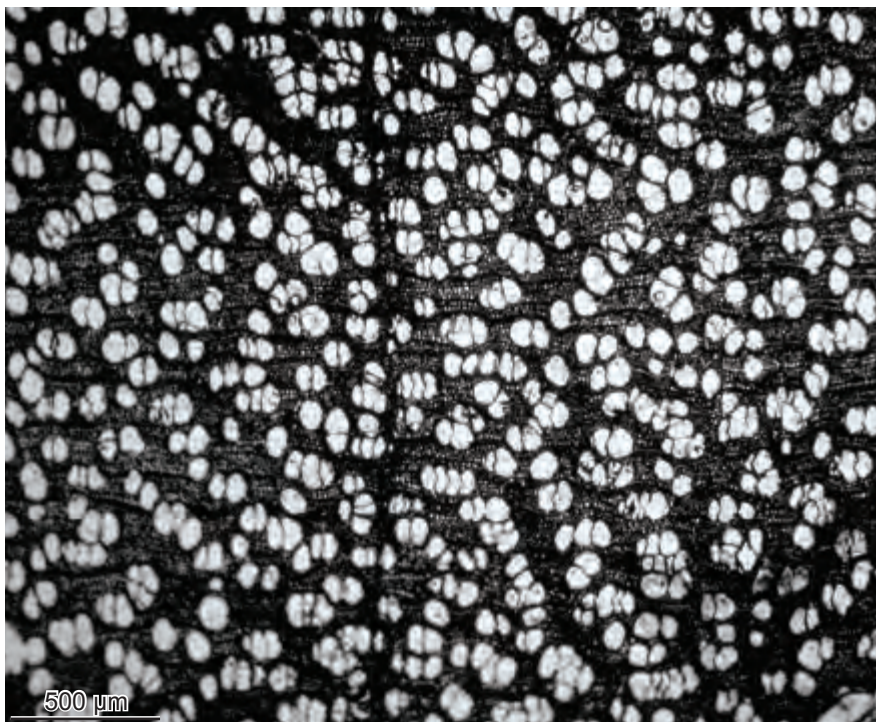


Fig. 3.24. Microscopic cross section of a piece of charcoal of *Betula* sp.

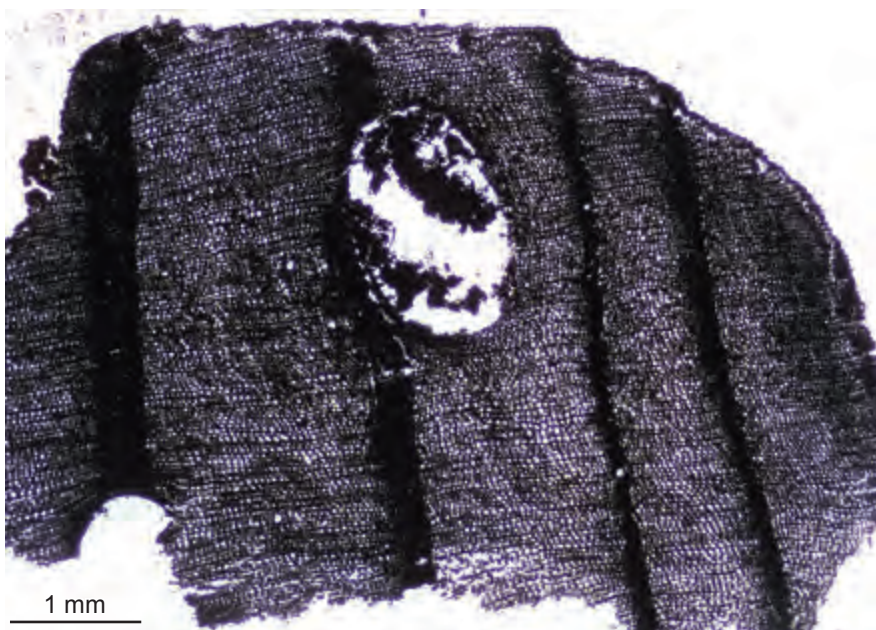


Fig. 3.25. Cross-section of a Neolithic, carbonized piece of *Abies alba* with an insect gallery.

3.5 Preparation of surfaces for macroscopic observation

Fresh samples (stems, root, branches) are cut with sharp paper knives or razor blades. Stick the 1 cm-long pieces of your sample into grafting wax or modeling clay and let them dry for a few hours. The dry samples and charcoals can be stabilized in grafting wax on glass slides or in petri dishes (Fig. 3.26).

Samples can be observed under the binocular microscope (Fig. 3.27). Objects in petri dishes can be closed, labeled and stored after analysis (Fig. 3.28). Charcoals with more or less flat broken surfaces can also be stabilized in grafting wax (Fig. 3.29).



Fig. 3.26. Stems in grafting wax in a Petri dish.



Fig. 3.27. Herb samples below a binocular microscope for counting rings.



Fig. 3.28. Samples with labels, ready for storage. Sample details can be written on the cover of the Petri dish.



Fig. 3.29. Charcoal stabilized in grafting wax.