

A Simple Apparatus for the Steam Method of Softening Woods for Microscopic Sections

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The original apparatus for softening wood by steam was introduced by Joseph Kissler, Vienna, Austria. The idea was brought to Mr. Stover by D. A. Anderson, who was studying in Vienna with Kissler. Mr. Stover developed the apparatus here described.

This apparatus has been in use in our laboratory for the past eight or nine years. It is simple to assemble and easy to operate. Live steam is simply played upon the wood while it is being cut. Water is heated in a hypsometer or steam boiler, having a capacity of about one quart. These boilers have a water gauge, an outlet for steam, and an opening for refilling. To the outlet for steam is attached a rubber tube in the end of which is inserted a glass tube drawn out in the shape of a pipette. The tube is fitted in an adjustable clamp so that it can be held out of the way.

The heating element we have used and recommend is an electric hot plate of durable construction with solid metal top, which gives an even temperature for a constant steam jet.

By using this method and a sliding microtome we have successfully cut all of the native wood, both green and old, with the exception of old wood of *Toxylon pomiferum*, which proved to be too hard to soften with steam.

It is especially noteworthy that we have been able to cut woody stems one and three years old. The steam is much easier to use than hydrofluoric acid or boiling the wood in water, which did not eliminate torn cambium cells and sections that split and cracked while being stained and mounted.

The time required to soften young stems may vary, but usually the best results were obtained by steaming for about five minutes before cutting.¹ Sections 10 to 15 microns thick showed no tearing of the cambium or pith cells. The sections did not crack and split when mounted in balsam as is common when other methods are used.

Staining is a matter of personal choice with most microtechnicians, however I wish to make mention of the fact that we have stained these sections quite satisfactorily with Delafield's Haematoxylin and safranin. Safranin is applied first and destained until only the bast and woody fibres remain a brilliant red. Delafield's Haematoxylin is applied by the dip method using ammoniated water as an intensifier and a fixer. Mature wood sections were best stained by the "quick method" of using iron alum-haematoxylin.

¹ With this apparatus it is not necessary to remove the steam while cutting.

REFERENCES

- KISSLER, J., Der heutige Stand botanisch-mikrotechnischer Schneidmethoden. *Biologia Gen.* Band IV. I. 1/2 Leipzig, 1928.
CHAMBERLAIN, C. J., *Methods in Plant Histology*, 5th Ed., 1934.