Identification of Soundboard Species

All soundboards are made of coniferous wood, meaning some form of fir, spruce, pine, etc. Cyprus was used in Italy and around the Mediterranean, while spruce dominates the north European building tradition. It is occasionally desirable to discover just what species you have, and perhaps more so when replacement is required and bits of the old board are still around. Unfortunately, this is not easily done even now, but the following contributes some modest information that may help us to get there eventually.

David at the Friendsofsquarepianos site sent me a sample of a spruce he had acquired some years earlier that prompted me to look for an approach to species identification. A specimen approximately 9 X 15 X 0.6 cm was submitted. The sample was obviously a spruce, and he had tentatively identified it as Sitka Spruce, Picea Sitchensis based on assertions from the owner of the mill that had handled it.

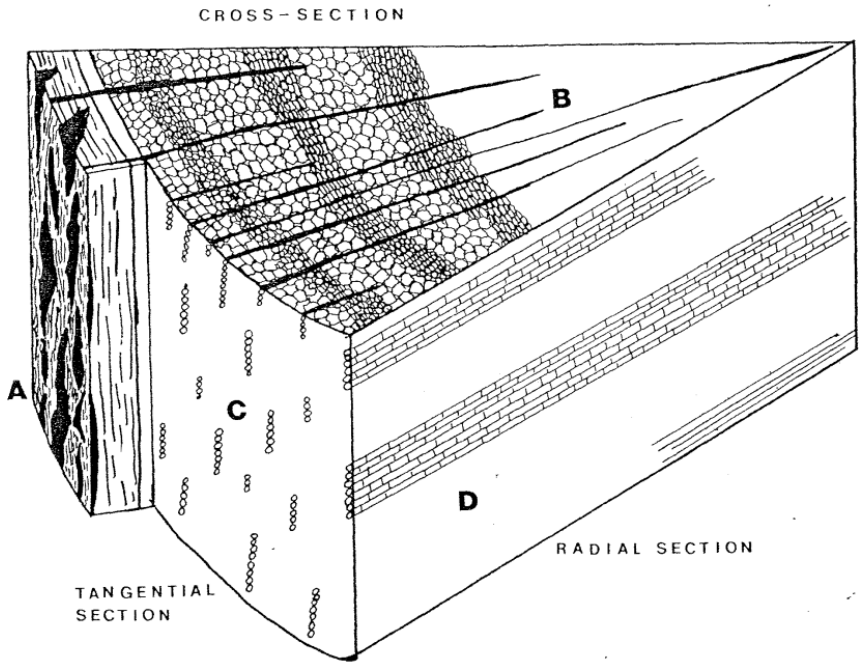
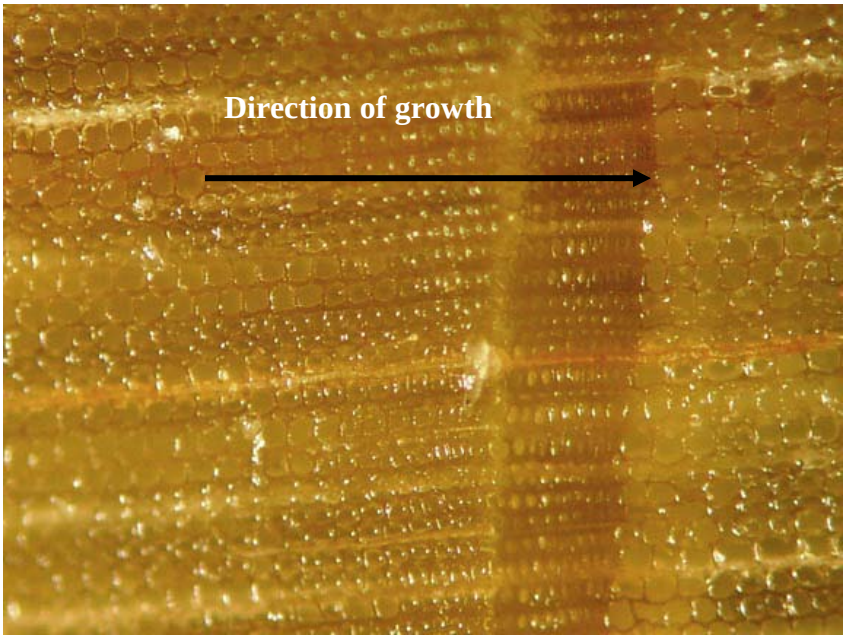


Figure 1. Stylized piece of wood, with the orientations used for sampling and identification labeled. Samples are taken from these orientations with a sharp razor blade, and then viewed microscopically (Friedman 1978:3).

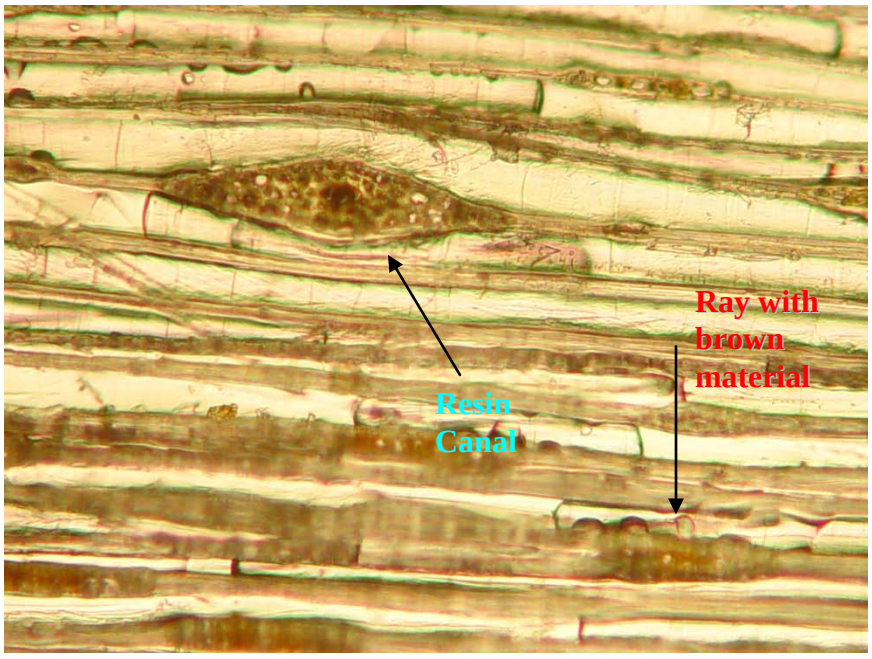
The sample had very even growth rings, almost exactly 1 mm spacing over the width of the sample, and the board was quarter sawn. Spruce can be distinguished from pine and fir by the smaller and far fewer resin canals present. In general, it is usually easy to distinguish the Genus of the wood, i.e. spruce, fir, or pine, but difficult to distinguish the species. However, in the work of wood anatomist Francis Kukachka, it is noted that Picea Sitchensis displays brownish accumulations in the rays[1].

The sample was wetted and cut in the radial and cross sectional direction. Photos below give the results:



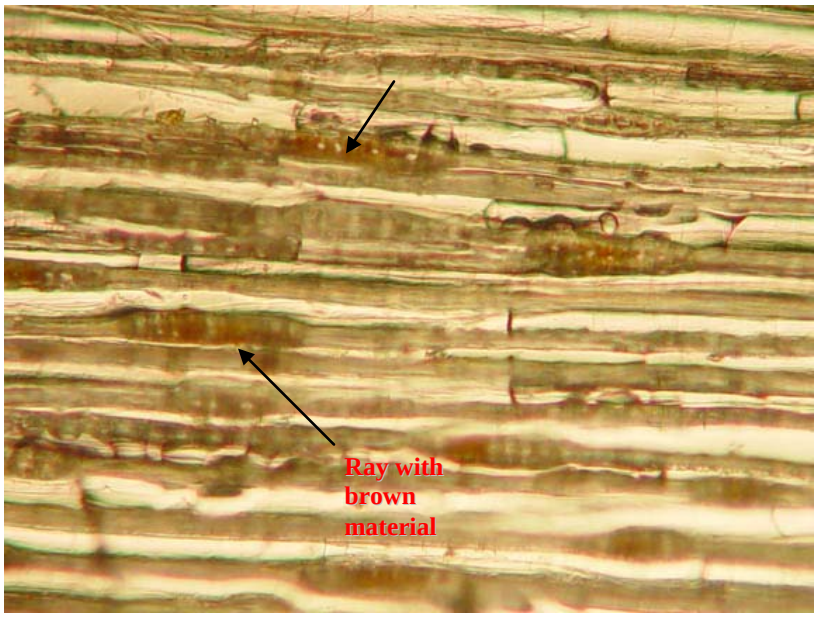
Cross Section

The cell size from the rapid growth period (spring, immediately following the end-of-growth ring cells) are somewhat larger and uniformly taper to the late growth cells. This is a clear sign of near ideal growing conditions, in a cool and regulated costal environment.



Radial Section

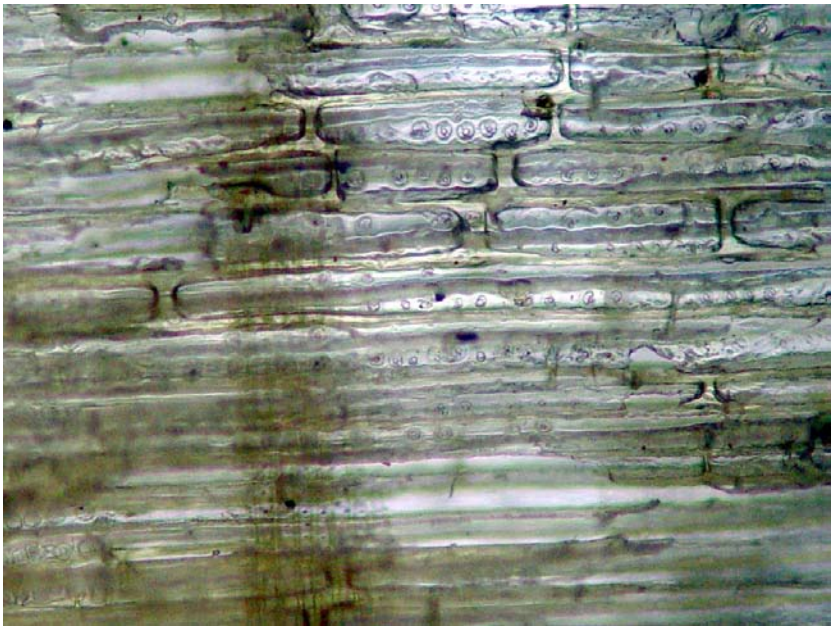
In this section we can see a resin canal surrounded by epithelial cells, and ray tracheids are present as well. There is evidence of the brownish deposit in the rays.



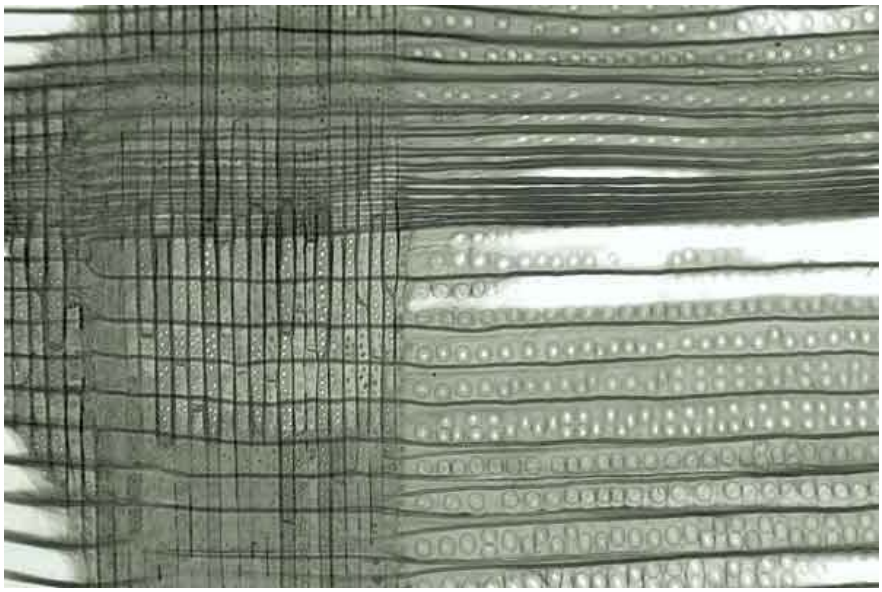
Radial Section

In our final picture we see the rays are distinctly brown, with 8 to 15 cells per ray. The sample is very probably Picea Sitchensis.

A section of wood from a 1791 Broadwood grand however, shows few resin canals, and no brownish accumulations in the rays:

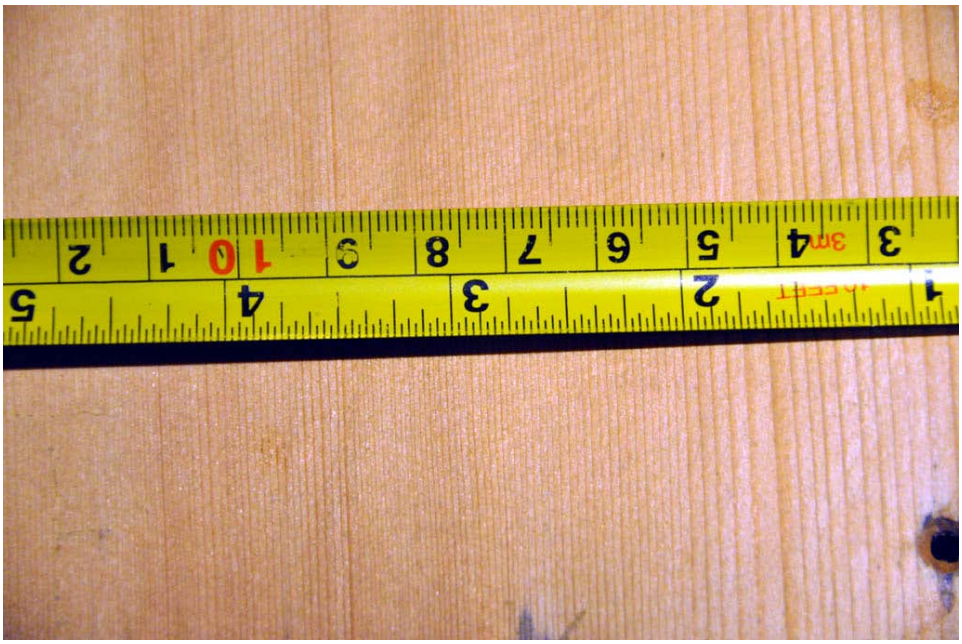


While spruce, this probably not Picea Sitchensis but one of the other species. Below[2], we see Picea abies Karsten - common Norway Spruce. There are similarities that may be worth noting, but a positive identification is not assumed.



Not infrequently, early pianos will be found with soundboards that have very dense ring-growth structure. The trees from which these soundboards came were several feet in diameter, and had been growing for more than 200 years when harvested. The resulting select boards often show the effects of the 'little ice age' where the growing season was shortened dramatically. Growth rings may number in excess of 45/linear inch as shown below:

1793 Broadwood – note the high density of the rings near the edge.



1791 Longman and Broderip with ~43 rings/inch

At this time there is a dearth of solid comparative wood analysis for the various species of spruce, but this site will continue to build on this subject.

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[1] Francis Kukachka "Identification of Coniferious Woods" Tappi; Nov. 1960 Vol.43, no. 11

[2] http://www.woodanatomy.ch/species_az.php

Section diagram from: "MICROSCOPIC IDENTIFICATION BY CELLULAR ANALYSIS:
A COMPARISON OF ARTIFACT PLANT MATERIAL FROM WET-SITES
ON THE NORTHWEST COAST OF NORTH AMERICA" Kathleen L. Hawes
The Evergreen State College