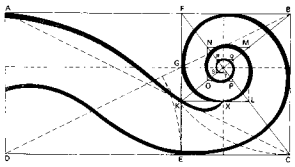

Maker's Bench

Dendro... What?

by John Waddle

Dendrochronology is the study of the patterns of growth of trees over time, due to fluctuations in climate in the regions where the trees grew.

As musicians yourselves, you have probably experienced buying an instrument for yourself, or selling an instrument that you personally owned. As string teachers, your students may ask you for advice on instruments they are considering purchasing. Of course, musicians want an instrument that gives them confidence when they play it. Does it play easily? Is it loud enough? Do you like the sound? Do your friends and colleagues agree that it sounds good?

For some people, a fine instrument can be a major investment. Prices for violins, violas and cellos can range for a few hundred dollars for a new factory-made instrument, to literally millions of dollars for a fine old antique instrument made by a famous luthier. Most instrument buyers rely on the expertise of violin dealers, an auction house, or they buy from a trusted private party. To determine value, or worth, an instrument has to have an identity. Who made it? Where did it come from? Is it old or new? How old is it? Is it in good condition? Some instruments have labels, some don't. Of course, instrument labels can't always be trusted. It can be a bewildering experience. Questions need to be answered.

Over the past year, after hearing about it for many years, I decided to try to learn more about dendrochronology—the study of the patterns of growth of trees over time, due to fluctuations in climate in the regions where the trees grew.

Trees growing in a region, and a time period, tend to have similar growth, different from trees from other regions and times. The tree rings tell the story of how the tree grew. Most trees, from the time they are tiny little saplings, until they are fully grown, will form one "tree ring" each year. If a tree grows in a warm climate where it gets a lot of sun and a lot of water, either from rain, or near a source of water its roots can reach into, it will grow a lot in the early part of the year (spring), and not much in the later part of the year when it gets less sun and less water (winter).

Dendrochronologists study these patterns in the tree rings and keep track of what the patterns are in the different time periods and regions for those trees. There are now specialists in dendrochronology and the identification of wood used in violins and other musical instruments. These people have been working in this area for many years and have built up data bases. Violin dendrochronology currently is only done on the spruce tops, not the backs. (I have been told the ring-pattern on maple doesn't replicate well at all in other trees, which makes dating an impossibility.) The study can be done from a photograph of sufficient quality, or an X-ray. The photograph or X-ray should include the entire lower bout of the front of the violin (no strings or tailpiece), because that will show the greatest number of grain lines.

I decided to see what I could find out by requesting dendrochronology studies on, so far, four different violins. The results from the first violin were fascinating. That instrument is a violin I have been asked to sell on consignment. It has a label, and has been certified as having made by Ferdinand Gagliano in Naples, Italy, in 1753. The certificate includes photos, and is from a well-known dealer.

The Gagliano family, starting with Allesandro Gagliano, born in 1665 in Naples, made hundreds of instruments over several generations, but there are also thousands of instruments with Gagliano labels that are fakes, so I decided to see what a dendrochronology study would show. Using an iPhone 12+, I took two photos. One photo of the bass side of the lower bout of the

Bass-side photo of violin labeled Ferdinand Gagliano 1753

Treble-side photo of violin labeled Ferdinand Gagliano 1753

Originally published in MNSOTA's *String Notes* — Winter 2021–2022 (Vol. 24, No. 2)

violin, and one of the treble side of the lower bout, and sent the photos to Peter Ratcliffe in England. Mr. Ratcliffe is currently one of the leading experts in the field of dendrochronology. I did not send any information about the violin of any kind other than the two photos. Mr. Ratcliffe's report came back via email and includes the following information:

"The belly of this violin is made in 2 pieces. The ring orientation (tree-ring growth direction) runs from the edges towards the centre joint in each side. A total of 92 rings were measured on the bass side and of 99 rings on the treble side. The most significant correlations against data from our database, place the latest clearly visible ring on the bass side at year A.D. 1769 and the latest visible on the treble side at A.D. 1767. The comparison of the plotted data shows that the two ring patterns of the bass and treble sides are different and therefore the wood that was used came from different trees (this is not unusual in Italian violins). The data from both sides cross-matches against published regional references from the northern Alps. The rings of the treble side contained a stronger "signal" than those from the bass side, therefore many more crossmatches were identified with regional references on the treble side. Generally, the strongest results suggest that the tree growth occurred along the current northern Italian borders with Austria and Switzerland.

"Data from both sides attracted many cross-matches with data from other instruments.

"The most significant cross-matches to the bass side with data from individual instruments from our database are as follows:

c. 1775 Nicola Gagliano, GB Gabrielli, Venetian violin c. 1730, Michele Deconet, Joseph Gagliano, Florentine violin attributed to Gabrielli, CF Landolfi, Paolo Castello, 1767 Gennaro Gagliano, 1791 Vicente Assensio (Madrid), Genoese late-18th century Mandolin, 1780 Castello cello, L. Storioni, Gennaro Gagliano, 1765 GB Guadagnini, etc.

"The most significant cross-matches to the treble side with data from individual instruments from our database are as follows:

"1790 J&A Gagliano (possibly from the same tree), Ferdinand Gagliano (possibly from the same tree), Guarneri del Gesu, c. 1770 Gennaro Gagliano, 1780 Tomasso Eberle, Francesco Gofriller, 1760 Tomaso Balestrieri, Pietro Guarneri of Venice, Nicola Gagliano, Cremonese violin attributed to MA Bergonzi, 1735 Guarneri del Gesu, c. 1760/70 Domenico Busan, 1759 GB Gabrielli, P. Castello, Michele Deconet, c. 1750 Neapolitan violin, 1741 Guarneri del Gesu, 1744 Guarneri del Gesu, GB Gabrielli, 1735 Guarneri del Gesu, etc.

"Data from both sides attracted very strong and numerous results, the vast majority with data from Italian 18th century instruments.

"Wood used in their construction can therefore be classed as being "typical" of the batches of spruce used throughout the Italian Peninsula during a good part of the 18th century. Generally, wood from these batches was rarely available after about 1790.

"Essentially with a dendrochronological date of 1769, a manufacturing date is possible from about 1775 onward although likely a little later.

"Based on the cross-matching results, we would therefore suggest that this violin was most likely made in Italy, and in view of the possible same-tree match with a violin by J&A Gagliano, it may also be of Neapolitan origin."

It is most common for violins, violas, and especially cellos and basses to have a top made of two pieces. Occasionally I'll see a one-piece top. I've personally made both types. With a count of 92 tree rings on one side of the violin, and 99 rings on the other, obviously the trees that the violin's top wood came from were at least 100 years old. How much older than that would only be a guess. The Northern Italian borders of Austria and Switzerland would be a large area. Whether it would be possible to be more specific, I don't know. Perhaps in the future it will be.

With latest clearly visible rings being identified as from the years of 1767 and 1769, according to the report, Mr. Ratcliff's conclusion is that the violins was made after 1775, which makes sense because if the trees were still alive in 1767 and 1769, there would likely have been more tree rings, years of tree growth, on both sides of the tree where the wood in the violin is visible, and it would have taken a few years after the tree was cut to process the wood and transport it to the location where the violin was made.

Mr. Ratcliffe lists a number of instruments from his data base which have similar wood, including ones from several cities in Italy, including Cremona and Venice, as well as one from Madrid, so clearly the wood from these forests was distributed widely over a long period of time.

A dendrochronology study will not tell you who made a violin, or the exact date it was made, but it will establish the earliest possible date for when it might have been likely to have been made. The date on the label of the Gagliano violin is 1753 (the last two digits on the label were handwritten, while the rest of the label was printed), but the earliest date that the violin could likely have been made, according to the dendrochronology report, is 1775.

A discrepancy between a date on a label, and a dendrochronology report does not mean that a the violin is not authentic. Another possibility is that the violin may be authentic, but the label itself may be fake, or the date on the label may have been changed. (There is still no substitute for the expertise of humans. So many violins have come into the world without labels, or with labels which were later taken out and a different label put in, that one cannot believe every label to be authentic.)

It is intriguing that the wood matches a known violin from 1790 by J&A Gagliano (possibly from the same tree) and a violin by Ferdinand Gagliano (possibly the same tree). Joseph/Giuseppe, Antonio and Ferdinand Gagliano were brothers in the famous family of luthiers. More and more it's becoming clear to me that so many instruments were made in shops where many people contributed in various ways to the creation of the instrument. J&A refers to Joseph and Antonio. Ferdinand is the name on the label of the violin I am researching.

Each of the other violins I've received dendrochronology reports on have also been fascinating, and each of them could be an article of their own, but for now I just wanted to give you an introduction on the subject of dendrochronology because I think it will be used more as time progresses. I asked Mr. Ratcliffe if he thought it was possible that the major Italian luthiers of the "golden age" were all buying their wood from the same wood dealer. He replied:

"I am quite convinced now that there was *one* main dealer, supplying just about anybody with some standing, between about 1720 and 1770/72."

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Originally published in MNSOTA's *String Notes* — Winter 2021–2022 (Vol. 24, No. 2)