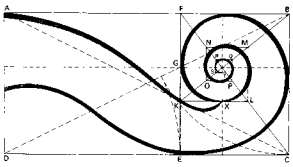

Maker's Bench

Carleen Hutchins — An American Luthier

by John Waddle

Cellist Yo-Yo Ma won a Grammy award in 1994 for Best Instrumental Soloist Performance (with orchestra) for his *The New York Album*, on which he played the Concerto for Viola and Orchestra (Op. Posth.): I II and III, by Bartok, on an "alto violin" made by Carleen Hutchins. The instrument has the register of a viola but is played vertically like a cello. Carleen's impact on the field of lutherie has been huge. Other researchers before her had carried out experiments on violin making and acoustics, but Carleen, with her science background and enormous passion, was able to carry forward what previous researchers started. When I attended the Violin Making School of America, in Salt Lake City, Utah, from 1978 to 1981, Carleen's research was starting to become more known, partly due to the organization she helped start, the "Catgut Acoustical Society." There were people then, and there are still some now, who were skeptical about the benefits of the research she was doing.

There are many variables to deal with when making a violin, things like the density of the woods, the hardness, the flexibility, resilience, the body shape, archings, thicknesses, balance points and graduation schemes, just to name a few. Decisions have to be made about which pieces of wood to use, historically which models have worked best for which instruments and how do deal with variations within models, etc. These issues are still being debated. Carleen gave us more tools to use to help with some of the choices. "Plate Tuning" is one somewhat reliable way to keep track of what you did on an instrument so that if the instrument sounds exceptionally well, you might have a better chance of making another one with similar characteristics. Carleen went beyond plate tuning to matching or recording air resonances and matching air cavity frequencies to body vibrational frequencies in fascinating ways. Other researchers of the past certainly worked on similar ideas long before Carleen and her colleagues, but Carleen revived the research and brought it forward in a big way. Even now, even though Carleen is no longer with us, people all over the world are experimenting with violin acoustics and using science to make better violins.

When Carleen Maley Hutchins was sixteen years old, in 1927, her high school physics teacher in Montclair, N.J. thought she needed an extra project, which would turn out to be her first introduction to acoustics. She placed tuning forks over glass tubes of different lengths, in order to learn how the tuning forks would resonate with different sized columns of air inside the glass tubes, thereby producing correspondingly different musical tones. She noticed that some of the forks sounded better with different columns of air than others. This turned out to be her introduction to acoustics, resonance, pitch and air modes. She had been playing bugle and then trumpet, learning how to play from the local piano tuner, who also played trumpet. She also took woodworking classes in high school. She bought the trumpet for $50.00 with her own money.

An Octet of Violins by Carleen Hutchins: baritone, small bass, 7-foot contrabass; tenor, alto; mezzo, soprano, treble violins

She went on to get a Bachelor's degree in Biology from Cornell University in 1933, and in 1942, she earned a Master's degree in Education from New York University. She married Morton Hutchins a year later. He was a chemist. A few years later Carleen was teaching elementary science in a private school in New York and was talked into learning how to play viola with a group of teachers. They thought the trumpet was too loud for the quartet music.

Her first viola teacher was Marie Bond, who was a student at Julliard and was teaching violin at the school where Carleen was teaching science. Within about a month, Carleen was able to start to play easy quartet music on the viola. She was using a borrowed eighteen-inch viola from the school, which she decided was too big for her to handle, so she bought a more comfortable student instrument from Wurlitzer's for $75.00.

In 1940, Carleen was given a chance to buy 150 feet of shoreline on a lake in New England, which she did, and then built her own house, including hand planing pine floorboards.

In 1947, Carleen had become interested in trying to make a viola for herself, which she did, with the help of the book *Violin Making as it was and is* by Edward Heron-Allen, and various friends, including John Fairfield, a salesman at Wurlitzer's, which was the biggest violin shop in New York. Mr. Fairfield would take Carleen's viola pieces she was making to the violin makers at Wurlitzer's and ask for suggestions and then bring them back to Carleen and tell her what to do next. This she did while she was pregnant with her first child. It took her about a year to finish that viola, as she took care of her young child at the same time.

She kept playing quartet music with various people in New York, and after about a year of playing her own first viola, somebody suggested she take it to New York violin maker Karl Berger to get his opinion. He told her it was much too thick

and heavy and proceeded to take it apart in front of her. He told what to do to improve it, which she did, and was pleased with how much better it sounded. Not too long after that experience, Carleen decided to make another viola to see if she could do better. This time she met Eunice Wheeler, who had a 1560 Gasparo da Salo viola, and let Carleen make patterns from it and measure its dimensions and study it. Carleen started working on the new viola and also met J.C. Freeman, another luthier who worked at Wurlitzer's. Freeman was impressed by what he saw when Carleen showed him the parts she had made and encouraged her to keep going. In 1950, she had a second child. By 1952, she completed the new viola, and was introduced to Simone Sacconi, who at that time was working for Emil Hermann. Sacconi was a very well-respected luthier who was world renowned as an expert on Stradivari. She continued to make more violas, with help from Berger, and by 1954 had made thirty-five violas and a cello, along with raising the two children. She made them on the kitchen table, and in various other rooms in the house.

At each step in the process of making a violin, viola, cello, or bass, one has to make decisions. The choice of wood, the design and dimensions, how high to make the archings, how thin to take the plates and where to make them thicker, and where to make them thinner, etc.

In 1949, Carleen met Frederick Saunders, who was a retired Harvard Physicist, professor, and an avid amateur violinist. Saunders had written papers on violin tone which Carleen had read, and the two started talking. Eventually they started working together. Saunders would suggest experiments that they could learn from and Carleen would do the work of making the instruments or modifying existing instruments. Their approach was to ask a "what if" question, do the experiment, and test the tone. Each time they learned.

One of the violas that Carleen made was tested by William Kroll, who was a teacher at Julliard. Kroll was very impressed by its sound, which encouraged Carleen, and she decided to take it apart to try to understand why that particular viola sounded that way. She found that the unattached "free" plates produced different tones when she held them at certain spots with one hand and tapped them at certain spots with the other hand, and that these tones could be altered by strategically removing wood a small amount at a time. Many experiments were carried out by Carleen and Saunders, all aimed at trying to find out reliable methods for making better sounding stringed instruments with more consistency.

Carleen was dedicated and passionate about what she was doing. She was a tireless worker. Other people before her had experimented with violin acoustics and Carleen researched as many of them as she could, learning what their conclusions were, and moving on with her own research. The magazine *Scientific American* published an article about Carleen's work titled *The Physics of Violins* in their November 1962 issue, with a picture of a violin being tested on the cover of the magazine.

Along with her vast contributions in the field of violin acoustics, Carleen is also remembered for her work in developing an octet of instruments that encompass the full range of the piano. (See photo on page page 1.) This idea was suggested to her from her friends Mr. and Mrs. Henry Brant, and Sterling Hunkins, who was a composer. They felt that what was needed was a set of instruments starting with a seven-foot double bass at the bottom and going up to an instrument an octave above the violin. When this was suggested, Carleen had by then made nearly fifty instruments, mostly violas, ten violins, and a cello.

To make the new family of instruments, she would need to work out various sizes of instruments with the resonances in the right places so they would sound good individually, but also within the group. To help with this work, she applied for, and was given a Guggenheim Fellowship. She also got help from John Schelling, who had written an article called *The Violin as a Circuit*. Schelling was at that time retired from a successful career as an electrical engineer and acoustician. He was also a cellist.

The idea of a set of instruments like this was not new, but nobody else was doing it at the time, and there were skeptics, but she kept at it, making one instrument at a time and making adjustments until they worked. She constantly sought the feedback of good musicians. She finally finished the octet which consisted of a treble violin, a soprano, a mezzo, an alto, a tenor, a baritone, a small bass, and a seven-foot tall contrabass The first trial of all eight was held in a studio apartment in New York on Carleen's birthday in 1964. The instruments have come to be called the Hutchins Violin Octet. After that, she made six full octets before she died. More of the octets have been made by other Luthiers all around the world.

Scientific American magazine published another article titled *Acoustics of Violins* on Carleen's work in their October 1981 issue, this time with a picture on the cover of three violin tops and three violin backs with patterns of vibrations shown.

I met Carleen Hutchins once at a Guild of American Luthiers meeting in Vermillion, South Dakota. Most of what I know about her is from the articles she wrote and from the book by Quincy Whitney called *Carleen Hutchins the Art & Science of the Violin*. If you are interested in finding out more about Carleen Hutchins and her work, I highly recommend reading it. It is very well done.

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