

Violins can mimic human voice

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For many years, some musical experts have wondered if the sound of the Stradivari and Guarneri violins might incorporate such elements of speech as vowels and consonants. A Texas A&M University researcher has now provided the first evidence that the Italian violin masters tried to impart specific vowel sounds to their violins.

Joseph Nagyvary, professor emeritus in biochemistry at Texas A&M,

says of the various vowels he identified in their violins, only two were Italian – the "i" and "e", while the others were more of French and English origin.

His findings published in the current issue of [Savart Journal](#), a scientific journal of musical instrument acoustics, have the potential to change the way violins are made and how they are priced.

"I expected to find more Italian vowels, what experts call the 'Old Italian' sound actually has the mark of foreign languages," Nagyvary confirms.

Nagyvary has held for decades that the great Italian violin makers, Stradivari and Guarneri del Gesù, produced instruments with a more human-like tonal quality than any others made at the time. To prove his theory, he persuaded the famed violinist Itzhak Perlman to record a scale on his violin, a 1743-dated Guarneri, during a 1987 concert appearance in San Antonio.

For the required comparison, Nagyvary asked Metropolitan Opera soprano Emily Pulley, a former College Station resident, to record her voice singing vowels in an operatic style.

"It has been widely held that violins 'sing' with a female soprano voice. Emily's voice is lustrous and she has the required expertise to sing all vowels of the European languages in a musical scale," Nagyvary explains.

"I analyzed her sound samples by computer for harmonic content and then using state-of-the art phonetic analysis to obtain a 2-D map of the female soprano vowels. Each note of a musical scale on the violin underwent the same analysis, and the results were plotted and mapped against the soprano vowels."

Nagyvary's 25 years of [research](#) on the project proved that the sounds of Pulley's voice and the violin's could be located on the same map for identification purposes, and their respective graphic images can be directly compared.

His discoveries are significant for two reasons.

"For 400 years, violin prices have been based almost exclusively on the reputation of the maker – the label inside of the violin determined the price tag," Nagyvary says. "The sound quality rarely entered into price consideration because it was deemed inaccessible. These findings could change how violins may be valued."

The new graphic images of the [violin](#) sound could also become an asset in teaching students to improve the quality of their tone production, he adds.

He says that in recent years, the violins of Guarneri del Gesù have surpassed those made by Stradivari: certain Guarneri violins now sell for something between \$10 million to \$20 million each.

Nagyvary was the first to prove that Stradivari and Guarneri soaked their instruments in chemicals such as borax and brine to protect them from a worm infestation that was sweeping through Italy in the 1700s. By pure accident, the chemicals used to protect the wood had the unintended result of producing the unique sounds that have been almost impossible to duplicate in the past 400 years, and his findings were supported and verified by the American Chemical Society, the world's largest scientific organization.

The retired Texas A&M professor has himself made violins that included carefully crafted woods soaked in a variety of chemicals.

Provided by Texas A&M University

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