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## MY PURSUIT OF THE PERFECT SOUND

From the lowest depths to the highest heights: Music envelops the complete spectrum of sound audible to the human ear: 20–20,000 Hz. But which of these resonances are able to touch our souls? German Martin Schleske, one of the best luthiers in the world, is in hot pursuit of the answer. In this essay, he describes his unique journey into the heart of sound.

20–20,000 Hz

### ESSAY

There are sounds that touch the soul. Sounds that comfort, strengthen and raise us up. A good sound has charisma. Though “charis” literally means “grace,” it also means “beauty’s charm.” Finding the perfect sound has become my purpose in life – a journey that has taken me into the heart of sound. In order to set off on that journey, however, I had to leave music school and enter a school for violinmaking. To move forward, I studied physics. And to get there, I dared the impossible – to create a sound that no instrument in the world has ever produced. But my journey has not yet come to an end.

Others may have finished their journeys. Such as the great Italian violinmakers Antonio Stradivari and Joseph Guarneri del Gesù. The secrets they took with them to the grave are inimitable – even to this day. Their instruments are not just works of art valued at millions of dollars – they are being played to this day by the world’s greatest virtuosi.

But how is that possible? It’s a question I’ve been asking myself since I was seven years old, when I was attending a small music school in Swabia. Music is my life. We

ϫ1. The master at work: Schleske’s studio is located in a nature reserve. When he opens his window, he can hear the sound of a babbling brook.

played music at home on Sundays. I’ve played in a chamber orchestra, a hard rock band and in the pedestrian zone. We even built our own tube amp. But the rest of the time, I was at school, listening to the constant answers to questions I had never asked. That’s why I left the music school after the 10th grade and began studying to be a luthier – a violinmaker. Driving me on was a dream of building instruments with a better sound than a Stradivarius and – should I not succeed – to find out why it wasn’t possible.

Did the masters of the 18th century have some kind of secret knowledge? Or was it the wood’s aging process



ϫ1. Historical scrolls and peg boxes: Our author has been studying historical violins from the 18th century for decades. ϫ2. Carving a violin: The inspired sound researcher hews the tonewood himself. In the laboratory, he applies varnishes he has prepared according to traditional recipes.



that gave their instruments the kind of mature sound a young instrument could never achieve? The violin originated during one of the most remarkable eras of all times. For the great masters of the Renaissance, combining art and science was just a matter

of fact. It is unfathomable to think of such artistic works being created without this special attention to detail and feel for nature. It requires an environment of gifted empiricism and holistic intuition to design such highly optimized acoustical systems. In the 19th century, however, the art of violinmaking fell prey to the trade of the industrial revolution.

The guild had sold its soul. But how would I manage to reconnect to the art of sound? I first began by trying out countless of the different recipes used to make traditional varnishes. However, it soon became clear to me that the old masters would have combined science without forfeiting art – just as acoustician Helmut Müller taught me. A physics teacher at my violinmaking school, he operated a research laboratory at his acoustic consulting firm Müller-BBM. It was in his laboratory that I was able to pursue the answers to all the unresolved questions I had tortured him with for so many years.

And then, a revelation: modal analysis. A method used in aerospace technology. I was the first one to apply it to the violin. At last, it was possible to actually see how the violin vibrates. The bulbous breathing in the lowest natural frequency – the Helmholtz resonance around 260 to 280 Hz. The strong distortion of the lower corpus resonances, the extensive motion of the plates and their two main resonances 440 and 550 Hz, and their wide deviations around

↑ 20–20,000 Hz

ESSAY



↑1. Corpus delicti: In the heart of the violin, Schleske is conducting research into the right resonances. →2. Work accomplished: "An individual acoustic and visual sculpture"

TUNING THE TONE

**35** Hz is how much luthier Martin Schleske was off the mark when he tried to recreate a Stradivarius violin in 1999. Germany's most famous violin manufacturer designed an instrument whose "spectral center of gravity" of 1,276 Hz was only very slightly above that of the old masterpiece (1,241 Hz). Using physics, Schleske wants to achieve something no one else has ever been able to do: to surpass the classic Stradivarius and del Gesù. No wonder Schleske is considered the "most informed and scientifically active luthier in the world" by a few Harvard professors. Schleske began studying the violin with Hungarian Attila Balogh, a soloist at the Berlin Philharmonic. Later, he learned the art of violinmaking in the Bavarian village of Mittenwald, a center of instrument-making. Today, world-renowned soloists such as Jehi Bahk and Ingolf Turban play his instruments. Schleske has a studio and sound laboratory at Gut Grubmühl near Munich, where he uses the new, leather-covered, luxury headphones from Sennheiser – the MOMENTUM. His book "The Sound: From the Incredible Sense of Life" was published in 2010 by Kösel Verlag.

the bass bar. The vocal formants from 700 up to 1,000 Hz, which give the violin its open sound. And, finally, all the islands of vibration that give the violin its brilliance swimming in the frequencies between 2,000 and 3,000 Hz. Finally, what was hidden had been revealed.

The longer I worked along these lines, the more I realized I didn't really understand the theoretical background. Left with no other choice, I completed a baccalaureate and studied physics. My only purpose: to continue my pursuit of the mystery behind a good, healing sound. It's what drives me.

After I received a master of physics, I had my first opportunity to experience a Stradivarius, one of the most famous violins of all times, first-hand in the intimate acoustics of my new studio. As soon as the bow struck the string, the room was filled with a warmth, a breath, a volume and radiance palpable even to an untrained ear. The Stradivarius is like a prayer dipped in the colors of sound. It's like being in a cloud of sound, a combination of gentleness and strength that is downright addictive. It was this violin that made me decide to become a teacher during my first years as a master violinmaker.

The violins of Guarneri del Gesù are completely different from a Stradivarius. Basically, its two main resonances are further apart. You can feel how the tones are kneaded and formed under the arch, positively sucking it in. The sounds are like freshly fallen snow that has been tamped underfoot – especially on the G string. It is a rich, crisp, satisfying feeling. Dense, dark and compact. And lower down

on the E-string, these violins have a reddish tone covered in a silvery iridescence. They can be almost archaic, hissing and large.

I'd been studying these violins for decades when, about a year ago, I had the feeling I had reached some kind of destination. When master violinist Ingolf Turban visited me at my studio, he fell head over heels in love with my youngest "child": the Violin Opus 130. Despite owning his own Stradivarius, he now performs all his solo concerts using my violin. "This violin is X-rated," he once said, winking at me. But his thanks said it all: "You have given me my voice!"

Even so, I haven't reached my final stop. For years now, I've been researching a novel type of resonance vibrato – a frequency modulation of the resonances themselves, something that to date has only been achievable by the human voice. There is no instrument in the world able to produce these types of modulations in which an oscillator, such as a vibrating string, "plays" with a sound board. The result would be monumental, producing a sound like never before.

I'm afraid one lifetime isn't enough to achieve my goals of beauty and perfection. Even so, it's not going to stop me from trying. ■



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