



MY VIOLIN, MY LAPTOP, MY SELF

[BY DAN TRUEMAN]

**EVERY MUSICAL INSTRUMENT—FROM THE STONE AGE FLUTE TO THE LAPTOP COMPUTER—
IS A PIECE OF TECHNOLOGY THAT SIMULTANEOUSLY DRIVES AND LIMITS THE CREATIVE PROCESS.**

When I was four or five years old, I used to rest my violin on my bed and gaze at it with a mixture of awe and lust. (I also wore every new pair of sneakers to bed the first night I had them—and sometimes the second night as well.)

My need to bed down with brand-new footwear has long passed, of course; but I am still capable of falling in love with an instrument. A photo of a nearly finished electric violin—sent to me by its maker to keep me abreast of its progress—is currently the screen saver on my laptop. I stare at this image often, imagining how the finished instrument will feel under the chin. In a similar musing about the piano, Charles Rosen writes:

Pianists do not devote their lives to their instrument simply because they like music: that would not be enough to justify a dreary existence of stuffy airplanes, uncomfortable hotel rooms, and the hours trying to get the local piano technician to adjust the soft pedal. There has to be a genuine love simply of the mechanics and difficulties of playing, a physical need for the contact

with the keyboard, a love and a need which may be connected with a love of music but are not by any means totally coincident with it. This inexplicable and almost fetishistic need for the physical contact with the combination of metal, wood, and ivory... that make up the dinosaur that the concert piano has become is, indeed, conveyed to the audience and becomes necessarily part of the music...." ["On Playing the Piano," *The New York Review of Books*, October 21, 1999]

Musical compositions particularize this fetish. To imagine playing the opening of the Bach Chaconne, for instance, or Nirvana's "Smells Like Teen Spirit," inspires a particular kind of physical response—we can feel the way the instrument would sit in our hands, how our fingers, deriving energy from the shoulders and spine, would drive the strings. Turn it around, and this sense of physicality becomes a compositional motivator; we imagine a particular kind of physical engagement and discover the music and instrument combination that will inspire it.

We tend to forget that the beautiful traditional instruments we play were once—like the electric violin—works in progress: unrefined, provisional. In some ways they still are, or can be understood as such, if we set aside our reverence for a moment. And it's easy to underestimate how much the design of these instruments has determined the history of composition, even the very essence of how tonal music works. Rosen takes this idea further: "the traditional construction of the keyboard...has had a largely

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unrecognized influence on the history of harmony, not completely benign," in part because, for example, "playing a melody in C-major feels very different under the hand from playing it in F-sharp major." For many composers, the relationship between our bodies and these instruments lies at the center of the compositional process, even if we don't acknowledge it.

I grew up playing chamber music with my family. My parents built the harpsichord we used for playing trio sonatas. I learned how to tune it, of necessity. The violin was something I took for granted as a kind of found object, unimaginable as anything else. It wasn't until my early 20s, when I was just starting to compose, that I began to look at my instrument differently, and with some suspicion. While I don't know that I could have articulated it at the time, I think I was aware that whatever musical voice I was going to develop would be deeply shaped by my relationship with the violin; in a very real and physical way, the instrument was (and would continue to be) a powerful and idiosyncratic filter for my entire musical existence.

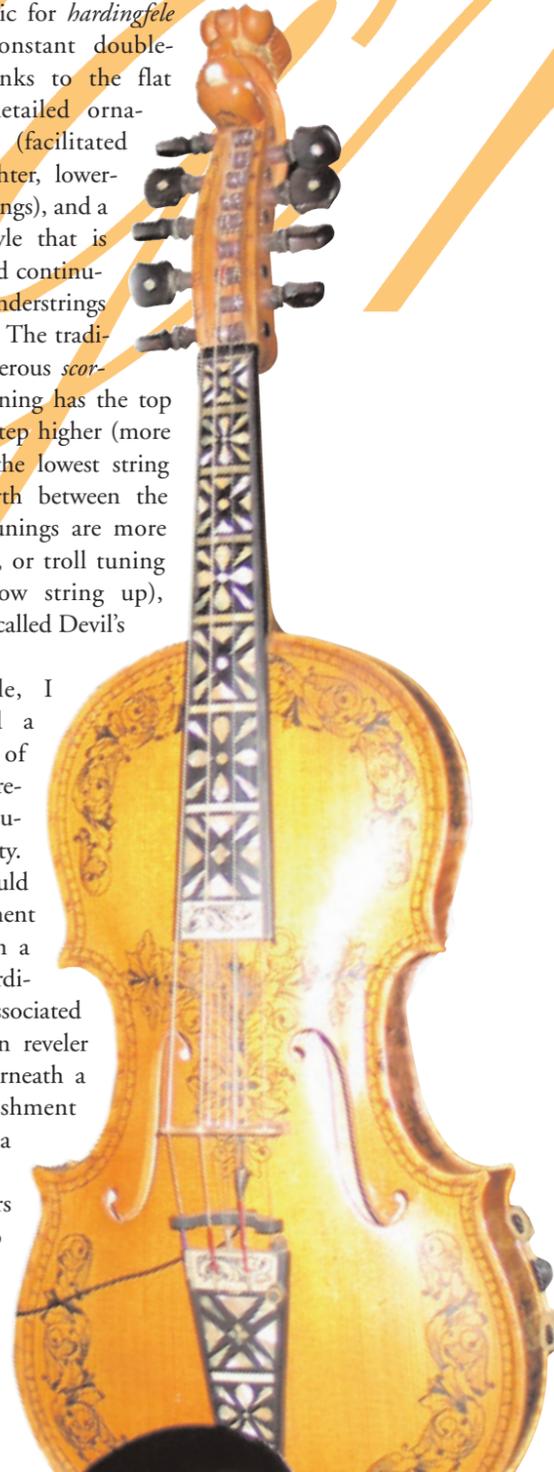
I began to think again about my family's harpsichord, how it was put together, and what it was like to tune. I started to see it not as a fixed and final entity—but as a glorious piece of evolving technology, something that people had designed, built, tweaked, broken, rebuilt again and again and again. Why should the violin be any different? Around that same time, I heard a recording of Anund Roheim, the legendary master of the traditional Norwegian fiddle. "What instrument was producing this incredible sound?" I wondered. I had to learn how to play it.

I learned that Norway's Hardanger fiddle (or *hardingfele*) has been around about as long as the "conventional" violin has. It has a nearly flat bridge and set of sympathetic strings that run underneath the fingerboard and through the bridge. These "understrings" are not bowed; they simply sing along, providing a kind of built-in reverb unit that generates a beautiful pentatonic glow. The neck is a bit shorter and at a gentler angle than those on violins today, and the strings are thus under slightly less tension. Virtually all the traditional music for *hardingfele* features constant double-stops (thanks to the flat bridge), detailed ornamentation (facilitated by the lighter, lower-tension strings), and a bowing style that is smooth and continu-

ous (in part to keep the understrings ringing without interruption). The traditional style also features numerous *scordatura*; the most common tuning has the top three strings almost a whole step higher (more or less than "normal" and the lowest string even higher, creating a fourth between the bottom two strings. Other tunings are more exotic, most notably *trollstilt*, or troll tuning (B, F#,B#,D#—from the low string up), which is associated with a so-called Devil's Repertoire.

In the Hardanger fiddle, I couldn't have encountered a more vivid demonstration of how technology influences, creates—even demands—a particular musical style and expressivity. *Hardingfele* music simply would not exist without its instrument (trying to play that music on a conventional violin is extraordinarily difficult). In a myth associated with *trollstilt*, an old drunken reveler discovers a dusty fiddle underneath a staircase and, to his astonishment (since he had never held a fiddle before), begins to play. Possessed, he goes on for hours and then days, unable to

A HARDANGER FIDDLE



stop. Eventually, he staggers off into the woods, still fiddling, and is never heard from again; hence, the Devil's tuning.

Much of my creative work for the past decade has been framed by my experiences with the Hardanger fiddle. It has informed my sense that musical instruments are more than vehicles for expression, that they embody musical values that are specific and historical. To this day, whenever I pick up a conventional violin, I feel Bach, Mendelssohn, Schubert, even Stravinsky. For me, it is almost an equation: Violin = Mozart (or Beethoven, etc.). The music of these composers has inhabited my body through the violin. Exploring the *hardingfele*, and the six-string electric violin (my other main instrument these days), was an essential move that enabled me to find new music while still taking advantage of the physical training I had as a violinist. These instruments were just different enough that I no longer felt bound by the violin equation, but similar enough that I could still, with some retraining, play them.

Since then I have composed *hardingfele* music, mostly in folk-inspired, chamber music settings. (My wife, a classical guitarist, and I form a duo named Trollstilt). I have also spent years working with the six-string electric violin, sometimes by itself, and other times in combination with a laptop. My first electric violin was a fretted six-string flying-V made by Mark Wood, but over the years—as I've returned to chamber music—I've moved toward designs with more of the sound and feel of acoustic instruments. I currently play a six-string instrument by Eric Aceto that has a full resonating body and a pickup embedded in the bridge. In my experience, this kind of violin has a more "colored" sound than a solid-body instrument, and it can better handle the weight of the bow arm. (I still play one of my solid-body instruments when it seems right, but it is nice to have other options.)

One of the wonderful things about the electric vio-

lin is that one has no illusions about its "completeness"; this is definitely a work in progress, and it invites us to imagine how it might be better. My early work with it was in rock bands and jazz ensembles, and I did what most electric violinists do—plugged into an electric guitar amplifier or PA system and had a ball. As I returned to quieter, more intimate chamber music settings, plugging in became less and less satisfying. In fact, I find it hard to imagine anything



less conducive to chamber music as I know it (both sonically and socially) than a PA system. To begin with, the PA system establishes a "plane of separation" between audience and performer, whereas one of the great joys of making chamber music is that it is not exclusively a performance-centric music; for many, it is simply about the activity of making music with friends. Even when working with a good electric guitar amp, it is difficult, if not impossible, to achieve a convincing ensemble sound and not feel as if the electronic sound is really coming from another world.

One of my most frustrating experiences working with the electric violin came in transition from playing at home, alone, to playing in a small hall with a couple other musicians. At home, I would sit and face the speaker, getting the sound full on. In the hall, such an arrangement was at best antisocial, so I ended up sitting next to the speaker. This still wasn't working for my fellow musicians and me; all the high frequencies vanished, and it sounded muddy—I began to play differently, going lightly on the low strings and desperately trying to get some highs, to no avail. The next time, I brought two speakers, setting one on the floor and angled up toward me, and the other facing the audience. Better: it sounded decent to me, and to the central part of the hall. But the high-frequency sounds still weren't reaching audience members seated on the sides, and the whole thing still sounded lousy to the musicians I was playing with. The setup was also cumbersome,

ugly and inelegant. Moreover, the electric violin still sounded like it was coming from a different world.

What was going on? As I learned from Perry Cook, my colleague at Princeton, acoustic musical instruments have complex sound-radiation patterns. Most guitar amplifiers channel sound in one direction, and as you move off to the sides, the higher frequencies gradually (or not so gradually) drop off. But acoustic instruments usually send their sound out in all directions, and what we ultimately hear is not the sound of the instrument, but the sound of the instrument *in the room*. That unique sonic signature is created by

speakers, pointing them at each listener, we clustered the speakers together, facing them outward so they could fill rooms the way acoustic instruments do, and placed this new creation right next to me (on the floor under my left ear, in fact!). Now, my electric violin can engage with the reverberant qualities of whatever room I am playing, be it a bathroom, a practice room, or a beautiful concert hall. While I am not inclined to dress up and declare “Mission Accomplished,” this was undoubtedly a big step forward; and over the past several years a growing number of musicians have been working with these speakers, coming up with new designs, and, more importantly, discovering new kinds of music with them.

For me, these speakers have opened new roads for electronic sound into the world of chamber music (emphasis on “chamber”). No longer do I feel that working with electric violin (and laptops) necessarily excludes me from my first love—making chamber music. My first electronic ensemble work was for violin, electric violin, cello, and percussion. After the premiere, I began walking off stage still holding my electric violin, only to be suddenly restrained by the audio cord that was connected to my spherical speaker. It was an amusing moment, but also indicative of my own musical experience: I had forgotten that I was plugged in, and was just making music.

At this point, it is fair to ask, “What’s the point? You’ve managed to make an electric violin sound ‘sort of’ like an acoustic violin. So why not just play an acoustic violin?” The term *sort of* is the key. After all, I want to take advantage of the instruments’ differences. My electric instrument has six strings (two strings are lower than the standard four), and much of my music explores the lower reaches of the instrument and varying *scordatura* (inspired by the *hardingfele*). More subtly, it offers different possibilities for bowing articulation, and (ironically) the amplification allows me to play very softly, revealing details of *tasto* or *sul ponticello* that would normally go unheard. On a more practical level, this kind of amplification helps my wife’s classical guitar be heard in our duo; the Hardanger fiddle is otherwise overwhelming. The broader point, though, is that working at the design level of new instruments can be the heart of the compositional process; we need look no further than John Cage and his wonderful works for prepared piano for inspiration here.

Since that first piece, I have composed chamber music for electric violin and laptop that includes hemispherical speakers placed in and around the ensemble. The speakers again play a crucial role, pro-

viding a voice that fills the room “acoustically.” The electronics come from within the ensemble, without the design assumption that this music is intended exclusively for performance—we can easily play this music in a living room. In one of these pieces—*Traps*, for string quartet, electric violin and laptop—the laptop processes the sound of my electric violin, cutting it into thousands of tiny bits and scattering them around a set of four hemispheres sitting on the floor. These bits can be transposed and layered, creating lush chordal “clouds” of sound (some online audio examples of this can be found at www.americancomposers.org/trueman_essay.htm.) The algorithm, though simple, has some unusual features that I’ve explored over the course of several years in through improvisation. (Improvising with experimental instruments is in itself one of my favorite activities, and essential to discovering the instruments’ potential.) These features became the driving force behind the composition of *Traps* and a subsequent piece for chamber orchestra and electric violin/laptop, *Traps Relaxed*. I would never have composed either of these pieces, or even been able to imagine them, without having the speakers and the algorithm in my own personal orchestration/instrumentation book.

In another piece, *Five (and-a-half) Gardens* (composed for Trollstilt and Sō Percussion), the choice and design of instruments was considerably lower tech, but technology was still central to the music. Here, the percussionists play a set of terracotta pots amplified with contact pickups and sent through a hemispherical speaker placed near the pots. The pickups allow the pots to match the rest of the ensemble in volume—plus, they create a wonderful distortion when the pots are struck hard! Within these same setups, the percussionists also perform on a set of tuned, amplified tubes that I call eToobs (these range in lengths from three to eight feet, and have small microphones embedded inside). The eToobs open up very low registers that are hard to attain with conventional percussion, and they can be played in various ways; if held vertically, they can be struck on the ground (like African “stamping tubes”), they can be hit with mallets, or, in one of my favorite applications, held up to the hemispherical speaker and used to create quiet squeals of feedback tuned to the over-

tones of the tubes—this last effect is highly performable (the percussionist Dave Cossin has become a master of this technique) and is featured extensively at one point in the piece.

Some of my adventures with music and technology stray far from chamber music as we know it. There’s the R-bow, a violin bow Perry and I created that is

IT IS EXTRAORDINARILY DIFFICULT TO CREATE NEW INSTRUMENTS THAT INSPIRE THE KIND OF FETISH MANY OF US HAVE FELT FOR THE VIOLIN, THE PIANO, THE GUITAR, AND ANY NUMBER OF OTHER INSTRUMENTS.



covered with sensors; the R-bow provides a highly physical kind of control for the laptop, much more so than, say, a foot pedal, and I use it extensively when I improvise. There’s the Bowed-Sensor-Speaker-Array (BoSSA), a sensor-covered sphere that sits in my lap; I bow this speaker with the R-bow, a laptop takes in all the sensor data, interprets what I am doing physically, and then generates sound that comes out of the speaker as it is bowed. BoSSA feels vaguely like a cello to play, and can really make me break a sweat! And then there’s the Princeton Laptop Orchestra (PLOrk), an ensemble I co-founded this past year that poses enormous challenges to composers and performers alike. In all of these adventures with crazy technology, the ideas discussed here, in particular the emphasis on the traditional feel of “chamber music,” always guide my thought process. It is extraordinarily difficult to create new instruments that inspire the kind of fetish many of us have felt for the violin, the piano, the guitar, and any number of other instruments. In some ways, the more cutting-edge the technology, the more difficult our task becomes. But as with many things, much of the joy is in the effort, and if history is any guide, we may just get lucky and make some wonderful music along the way.

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the sum of reflections of that instrument’s sound from the walls, floor, and ceiling at our particular location. (Of course, anyone who has played an instrument in a bathroom and then in a soundproofed practice room knows exactly what this is all about.) One way to emulate the natural situation is to add artificial reverberation (such as the built-in effects of Yamaha’s Silent Violins). Such reverberation, however, is never the same as the reverberation that your fellow acoustic musicians are experiencing in whatever room you are in that particular day. Oil and water, still.

A few years ago, Perry and I embarked on a research project to learn more about these issues. One result was the creation of several spherical and hemispherical speakers. We first built these speakers out of wooden salad bowls purchased at Ikea. Here is the recipe: put the bowls face to face, cut holes in them, drop in a dozen small speakers, mount the whole thing on some tom-tom drum legs, and—Voilà!—you have a spherical speaker (and something that looks a bit like R2D2, or some kind of deep-space or deep-sea explorer). Instead of adding more and more