Charley Hansen: The Wizard of Boulder

Twenty-three years ago, in 1993, Charles Hansen cofounded Ayre Acoustics, Inc., in Boulder, Colorado. On Ayre's website, Hansen is named as Research Director for Ayre, and it seems an apt description. Along with experimenting in and developing audio-electronics hardware and software, Hansen has strongly hewn to certain design principles, among them fully balanced operation, an absence of loop negative feedback, and solid-state circuitry. Ayre's current flagship preamplifiers and amplifiers, the twentieth-anniversary R Series, have received reviews and accolades, while at the other end of the budget spectrum, Hansen's design work was a key element of Neil Young's widely publicized and crowdfunded PonoPlayer project.

My *Stereophile* colleague Herb Reichert described Hansen to me as "a wizard." But Charley (as he prefers to be called) lives not in Middle-Earth but in Colorado. Perhaps it's the water, or the air, or both—people in Boulder are a bit higher than in Denver. Whatever the reason, Boulder is home to several high-end audio companies.

In 2006, in a bicycling accident, Charley Hansen experienced a severe spinal-cord injury that left him partially paralyzed (footnote 1). Some might have been defeated by such an event, but Hansen has actually increased the pace of innovation and high-quality manufacturing for which Ayre Acoustics has become known. Here is part of a recent conversation I had with the Wizard of Boulder.

Sasha Matson: Are you pleased with the state of high-end audio in general?

Charles Hansen: High-end audio is a mirror of the world at large, best summed up by Charles Dickens: "It was the best of times, it was the worst of times." When you think about the world—all the horrible things that are happening—then you can go on about all the wonderful things that are happening: that we can have this Skype call. You are in Cooperstown and I'm in Colorado, and we're having a video call! Remember when we were kids, and Dick Tracy had his [two-way wrist radio]? And it's happening right now. Or music—you can put your entire music library on a computer, and push a button, and have it magically appear.

SM: How did you get started in what I like to call "music re-creation"?

CH: My first manufacturing job was cofounding Avalon Acoustics. I had made some fundamental breakthroughs in loudspeaker design. To me, they were so dead simple and obvious that we never talked about it. I thought that if we talked about it, everyone will just copy us. And here it is, 35 years later, and guess what? There are only two companies in the world that have figured out what I figured out 35 years ago.

SM: Do you want to briefly state what that is?

CH: It's called pistonic motion. And people have been talking about it for 10, 15 years. And mostly they don't really know what they're talking about.

SM: At this point, is the tired old debate of solid-state *vs* tubes over?

CH: Yes and no. It kind of goes back to the best of times and the worst of times. There are two different things going on. There's the surface, and what is underneath the surface. On the surface, things have been converging for a long time, and that's what you read about. But then there are some writers that talk about what is under the surface. When you read something from Art Dudley or Herb Reichert, they aren't talking about soundstaging or imaging or resolution—or all these terms that first [J.] Gordon Holt [founder of *Stereophile*] and then Harry Pearson [founder of *The Abso!ute Sound*] came up with. What it boils down to is that when you listen to music, it makes you feel a certain way, and that's why you listen to it. It's not because it *sounds* a certain way. And how do you talk about your feelings? So the sound of tubes and the sound of transistors have been converging—but what about the feeling?

I didn't really understand it for a long time. When I first made the Ayre MX-R amps and KX-R preamp, I thought, *Okay we've done it. We've made stuff that is so good it's as good as tubes—why would you bother with tubes?* But I would still get customers and manufacturers who would say, "Yeah, that's nice, but I'm still sticking with my tube piece, because you haven't got there yet." And one of my weaknesses, for better or worse, is that I have such a big ego, I don't have to listen to other kit. I just listen to my own designs. If I had, I would have known what they were talking about.

When we made the KX-R Twenty, we took all our ideas we had been working on for 20 years, and getting feedback from people who were able to teach me how to listen better, and what to listen for—20 years of hard work. And then I hooked up the KX-R Twenty and I went, "Holy cow! *This* is what they were talking about. No wonder they didn't want to listen to solid-state—*this* is what they wanted to hear." It just hit me: *This* is what all those tube nuts were talking about. I would send stuff off to these dyed-in-the-wool tube guys, and they would say, "Nope, it's gotta have a tube in it or it's never going to work right. No, it's just sand. How can it sound right?"

SM: And there are other factors, like break-in time.

CH: This is all just theory, but I think that as you strip away all the colorations, all the things that shouldn't make a difference become more and more important. As you peel back the layers of the onion and you get rid of all these first-order problems like feedback, and second-order problems like the power supplies, and third-order problems like the grounding schemes, and fourth-order problems like the PCB layout—then you start to get into Woo-Woo Land. Like break-in time, and what are the feet made out of, what is the plating on the conductor of your power cord.

SM: The voodoo dimension of audio.

CH: Careful system setup is at least half of it, if not more. I'll tell you a story. One year, we went to [the Consumer Electronics Show]—we had the prototype MX-Rs. I said, "Let's go with Wilson [loudspeakers]." They sent them to us a month ahead of time. We took that system—it had been all dialed in, all broken in, and set up for a month in our listening room. I knew how it sounded. We drove it to the show, and set it up, and I listened to it and I said, "Something's wrong. This does not sound the way it sounded back home." This was in a room we had been in before—I knew how it sounded. I spent five hours trying to figure out what it was. I was trying everything

I could—room treatments, moving the speakers around. I was so frustrated. The show's about to start—it sounds wrong—something's wrong with the system—it's broken.

I lean my head against the wall, and I'm practically in tears and exhausted. I'm ready to kick a hole in the wall. And I'm looking at my feet. We put all our cables on these little wooden blocks. But guess what? The power cord going from the wall to the preamp was missing one wooden block. So there was two inches [of cord] that looped down and touched the carpet. I said, "Why is this cable touching the carpet?" There were only two guys left with me at that point, as everyone else had gone to sleep. And one said, "Oh yeah—I was setting it up and I ran out of wood blocks. I meant to get another one, but I forgot." I said, "Go get that other wood block, please." We put that one wood block underneath that one power cord, and I listened to it and I went, "Aaaahhh. Now it sounds right—now we can go to bed!"

SM: The devil is in the details.

CH: And the flip side of that: God is in the details. When you get the details right, you get to experience the beauty of music.

SM: What comes first when you start a new design: thoughts about technology, or musical and sonic goals?

CH: For me, it's always the technology. Because I already know what it's supposed to sound like. I have two boys, and we sent them to the Waldorf School. In third grade, they get to pick an instrument. They both picked violin, so every day for 10 years I heard a live violin being played in my house; I know what it sounds like. You know what a voice sounds like—you pick up the phone and hear someone's voice you haven't heard for 30 years, and you can recognize it. What can I do to get that sound in a stereo? What is going to capture that magic, wiggle the air? It is so ineffable, nothing you can measure. I figured out some secret measurements for speakers that I can't talk about. But for electronics? Not one.

SM: Do you think people can have an emotional reaction to the re-creation of music that is comparable to what they feel at a live performance?

CH: The key word in that sentence is *comparable*. There is something that is really special about a live performance. That's why you go, that's why you pay. Today, if you are crazy enough to set up a really good stereo system, you can press a button and get that on demand. It's not the same, but it is comparable—it creates that same type of feeling.

SM: Ayre offers products at the upper end of the high end in terms of cost, but you've also designed for the other end of the price spectrum, particularly recently, for the PonoPlayer.

CH: I am so proud of the PonoPlayer. I think it is the best thing I've ever done in my life. Yeah, it doesn't sound as good as the other equipment we make. But you keep learning—you keep peeling back layers of the onion. We've got new tricks now. A lot of what we've figured out is really scalable. You can do it at a higher level, with

solid aluminum chassis, and super-expensive connectors, and super-expensive circuit boards. You can also take that basic technology and implement it at a much lower price point. Now a "normal" person can get that same feeling, without spending tens of thousands of dollars and dialing in the system just right.

SM: You put a lot of emphasis on parts quality and upgrade paths. How do you go about vetting all that?

CH: I've got an advantage: I'm single-minded. When I get on to something, I'm like a pit bull on a pant leg—I do not let go. I'm fanatical about everything. Take resistors—here's what we do. We make a fixed attenuator. We take two of the best XLR connectors we can find, and we solder them back to back. So we are either listening to the best piece of wire we can find or we are listening to a resistor. And with the right gain, we can compare resistor to wire bypass, with everything else constant: the same number of connectors, the same number of solder joints, the same brand of solder. We do similar things with other components.

SM: So the bottom line is that you're doing A/B comparisons that are based on actual performance and listening?

CH: Oh yeah. And it is very rigorous. And when we compare, everything has to break in as well. We have figured out ways to accelerate that break-in process, as otherwise it would take years. You have to be smart, and you have to be methodical. I can tell you stories. For example, to make a solid-state circuit sound good, if it's in the analog domain, the input has to be JFETs. Because if you use anything besides a JFET, it has got to be capacitor-coupled. And there is no capacitor that is as good as no capacitor. Guess what? They stopped making JFETs. We couldn't get what we wanted, so we bought a 50-year supply. It was a big pill to swallow!

SM: Is there more than one way to get to the goalpost with factors that are important to you in your design work?

CH: That's a really good question. For me, the question is: What can you leave out and not lose the magic? When we did the PonoPlayer, it was, "Oh, we can't do this, and we can't do that, it's got to work off batteries, it can't use that much current, it can't use that much space, and it can't cost that much." So where can you cut the corners? Everyone misunderstands balanced circuits. This started in the studios—worrying about hum pickup in walls with a lot of other wiring. But we are not worried about hum pickup in home audio. What we are worried

about is that every circuit in the world is a modulated power supply. A balanced circuit rejects imperfections in the power supply the same way balanced cables reject hum. With fully balanced circuitry, all of a sudden your power supply becomes a thousand times better—literally. That's all it is. Remember, garbage in, garbage out. The better your power supply, the better your circuit is going to sound—both analog and digital.

SM: When you listen to music re-creation, what are you listening for? What is most important for you?

CH: When you get a new component, you set it up carefully in your system as best you can, and you make sure it's broken in, and maybe you have to try some different mix-and-match variables. You find a good combination, whatever it takes—and it's either going to be compelling to listen to or it's not. Either you get engaged with the music or you don't. In 30 seconds, you can go, "Oh—yes, this is good, I can feel it, this makes me feel good." Or "Oh, this is just a noise, a recognizable noise. I can recognize that this is Beethoven, or the Beatles, but it doesn't feel like anything to me—it doesn't suck me in."

SM: When I'm engaged with music, sometimes I feel that I'm getting a physiological transfusion of energy. Has music given you strength to address the challenges you face?

CH: Absolutely. That's why people pay money to go to that live concert—because they get that transfusion. There is that whole thing about distractions. Like when you get something in your eye—you get that gnat out of your eye because it hurts. Since I had my accident, it's been over nine years now. The level of pain I have on a daily basis is hard to talk about. You can kind of imagine: If you were at a concert, you went to the symphony, it's at Carnegie Hall, it's your favorite composer, your favorite conductor. You're all excited—and suddenly, someone pokes you in the eye. Ow! That hurts. How can you enjoy that music now? That's been my challenge. I don't listen to as much music as I used to. It's been a blessing to have the PonoPlayer. I can get a music fix—and not try and have to sit down in front of my stereo, try and set some time aside, try and ignore the pain.

SM: It means a lot to people, Charley, that you continue to be creative and do great work with Ayre.

CH: What's the number-one rule when you go camping? You always leave the campsite better than when you found it. A very wise man once told me that is our true purpose in life: to leave the world a better place than when you came. It's the most I can do.

Footnote 1: Ayre Acoustics has a page on its website to help raise funds for spinal cord injury research.