By C.J. Huss

Chapter Six
Time For Some Straight Talk, Folks!

As I've noted in some previous columns, the technology behind analog music disc recording, manufacture and playback is rather remarkable, but, largely do to, having been around for over 100 years, the technology tends to be taken for granted.

Understandable, but... sometimes unfortunate, as a lack of awareness often allows for music lovers to be led astray by dubious or even totally false claims made by both record producers and equipment manufacturers. Even among audiophiles, significant arguments often occur when discussing the advantages or disadvantages of some particular technical method or device.

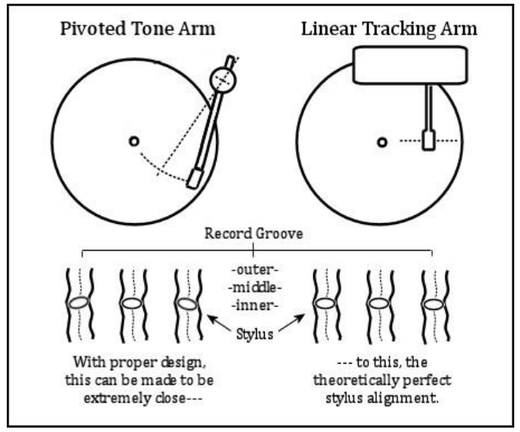
In a future column, I'm going to get into the subject of cables (speaker, interconnect, etc.) and the supposed vs. real effects they have on the accuracy of an audio system. Yes, I'm that foolish, but as a man of science, it perturbs me greatly to see people spend sometimes huge sums of money on products more grounded in mysticism than reality.*

However, this column is a follow-up to the last one where I was discussing a critical element of turntable operation, the tonearm and cartridge. In that column, I briefly mentioned a variant of tonearm referred to as "linear tracking". Most turntables have a tonearm which pivots on bearings, resulting in the stylus ("needle") swinging in an arc across the record surface. Properly designed, this method works quite well, and is mechanically fairly simple.

So why have any other type of tonearm arrangement—such as one that traverses the record in a straight line, thus the "linear" designation? Because some engineers have pointed out—correctly—that when a record is first physically mastered or "cut", the cutting stylus that makes the groove is driven across the recording blank in a straight line. Ideally, then, the record should be played back that way for maximum accuracy in getting the music info back out of the groove. A mirror-imaging kind of deal, as it were.

But why would a pivoted arm be any less accurate? Many very expensive, state-of-the-art turntables use pivoted arms, so how much difference can there be? The key here is those two words mentioned above—"properly designed". 'Tis about math, I'm afraid, but it really isn't that complicated, unless you're actually building a record player, then, well—okay, it is.

But the gist of it is due to the fact that since a pivoted tonearm moves the stylus across the record in an arc—part of a circle—the stylus tip that's down there in the groove can only be perfectly perpendicular to the groove at two points along that arc. See the drawing below:



So, why is that important? Actually, it wasn't until stereo records came along, with their two channels of audio encoded into a single groove, and secondarily the desire to have more accurate reproduction of higher frequencies than was previously possible. These changes brought about the requirement for a stylus tip that was shaped like an ellipse rather than round.

On a monaural ("mono") record, information in the groove only moves the stylus side-to-side**. With a stereo groove, the stylus has to move both side-to-side, and up and down. Without getting into the mathematical specifics of this, it's because the groove is cut with the information for the right channel on one side of the groove wall, and the left channel info on the other wall. While a round stylus tip can play this as long as the cartridge design allows it to move freely left/right/up/down, it loses information when there is a significant difference between the two audio channels.

Shaping the stylus tip into an ellipse allows better overall tracking of a stereo groove, because the narrower part of the tip can follow the groove much better. Also, all else being equal, the narrower the ellipse, the better the high-frequency tracking. This is why as you check out better quality magnetic cartridges, you will often see terms like "hyper-elliptical", "fine-line", "micro-ridge", etc. applied to the shape of the stylus.

Okay, yeah, yeah, you're thinking-- maybe even saying out loud if the audio spirit really moves you—what does this have to do with the pivoted vs. linear deal? Because in a stereo groove, where the channels may contain different audio signals, *if the ellipse is not perfectly at 90 degrees to the groove*, information can be lost or distortion occur. And it is mathematically/physically impossible for a pivoted arm to keep that 90° alignment except at one or two places on the record surface. But-- if the arm moved across the record in a straight line, then that 90° alignment could be maintained everywhere! *Whoa... how cool!!* Indeed.

But as with most things in life, and especially in engineering, trade-offs may occur. The big trade-off here is that having the tonearm move across the record in a straight line means much higher mechanical complexity—normally a motor and drive system to move the arm, extra electronics to control that movement, the same high precision in the arm itself as a pivoted arm, and so on. Higher cost? Unavoidable. Less reliability over time? Almost inevitable. But it's worth it, right, for better sound?

Ahhh, there's the tricky part. Theoretically, yes. In practice, in the real world? Not always. There is a limit to what we can hear, and if the errors that occur in any playback system are small enough, we won't hear them. A well-designed and built pivoted arm, with a properly aligned cartridge, will out-perform a poorly-designed linear tracking setup. The devil, as the venerable saying goes, is always in those details.

Now, to be absolutely clear, I am not prejudiced against linear-tracking turntables. In fact, there have been designs I've worked with, even owned over the years that I find truly superb and would heartily recommend, with the caveat just mentioned about long-term reliability. There is also one truly great advantage to linear-trackers that is often ignored, which is actually of much greater real-world benefit than the usual issue of perfect stylus alignment. What be this, pray tell?

The lack of skating force, and so the lack of need for anti-skating compensation, a standard fixture on any decent pivoted tonearm. So-- what is skating force?

Hey, how convenient, that cleverly leads us right into next issue's column, which in all likelihood I will cleverly name, "Straight Talk, Part 2". In the meantime, as always, thanks for reading, and enjoy your tunes, cleverly or just any old which way!

Take care,

-- C J

* The science behind audio cables is real, it's just not anywhere near as involved as some contemporary manufacturers would make it seem. But, it's become a subject for great controversy in the industry, and so highly relevant for equipment purchasers.

** In the very early days of disc recordings, there were some instances of "vertically cut" grooves, where the stylus moved only up and down, not side to side. This technique was uncommon, though, and since it had no real advantages over laterally cut grooves, and some disadvantages, it was abandoned. A modern stereo cartridge could safely play back these kinds of disc (with the proper stylus type), but the electrical signals from it need to be handled differently.

Oops! I Didn't Know My Guitar Teacher Was Famous

By Dan Wolfe

In 1966, the small college town of Gettysburg Pa. was the place to be if you were a teenager. As the record stores sold out of the top ten tunes each week, dozens of local bands seemed to appear overnight. This was the year that my best buddy Grant and I would finally take guitar lessons. He mentioned that he knew a guy who only charged two bucks each if we took lessons at the same time. Being 12 years old, this was the only affordable way to go. Grant was 15 and we both already had taught ourselves some basics on guitar. We could play Gloria by the Shadows of Knight for 30 minutes nonstop so we thought we were quite cool!


Grant and Dan in 1966 and again in 2016

With guitar cases in his back seat, Jim showed up for our first lesson in his 1965 red Mustang convertible. We were car enthusiasts too, so things became even more exciting. Jim was quiet and friendly for an older kid of 19. He asked us what our musical goals were. We both wanted to play in a live band, so Jim put all his music books away and produced a bag of 45's. Most kids were taking lessons from elderly teachers at music stores or school. They were bored to tears as they were forced to read music to songs from Teddy Roosevelt's era. Jim allowed us to choose Time Won't Let Me by the Outsiders which was my favorite tune at the time. Jim worked with us for only two months, every Sunday for an hour. He held our interest and even showed us a couple of "tricks" that older, experienced players use. Without realizing it, Grant and I were learning to listen, feel and understand the art of playing live thanks to Jim's unique way of showing us how it's done. As our final lesson, Jim took us to see his band perform.

I realized then, that live music would forever be part of my life. We watched this amazing band cover almost every top 40 and soul tune of the day, flawlessly, as Jim's "trade secrets" were on display for his students. We lost track of Jim soon after that. Fifty plus years later, I still use every guitar technique learned during those few months back in 1966.

I'm not famous, but thanks to Jim I have never been without a job playing music. Recently I was talking with some country musicians who asked me if I ever took lessons. I told them about Jim. It took a second to think of the last name...Allison, from Gettysburg. Played in a soul band in '66...These guys shook their heads in disbelief and asked me which Jim Allison? The renowned doctor, or the Nashville producer. What?? Did I miss something? Yep.

Long story short, I had no clue that Jim Allison had gone on to become a well respected producer/songwriter of country music, NNS Records. It seems ol' Jim has been in Nashville for 25 years working with everyone from Blake Shelton to LeAnne Rimes (her Fade To Blue was co-written by Jim.) And then there is Reba's #1hit, What Am I Gonna Do About You. The list of name artists goes on and on. NNS Records has moved to New Jersey although Jim still has a studio in Nashville. When I finally caught up with Jim Allison, the only thing I could think to say to him after fifty years was "I didn't know my guitar teacher was famous!" There is great Q&A interview with Jim Allison at Nashville North Studios, nnsrecords.com To me, he's still good old Jim from Gettysburg.