Welcome to *Copper* #20!

I think this is a particularly interesting issue, and I'm happy to tell you that we have some *surprises* and *new contributors* lined up in the next few issues.

The title above is using "hits" in the same way that Dan Schwartz used it in *issue #16*. Dan looks
at the roll call of musicians who've passed this year; his look at Leon Russell thankfully has some joyous music from Leon's incredible life and career. Richard Murison looks at sampling, after 50 years---and there may be a geek joke in that statement. Larry Schenbeck looks at bad manners in music; Duncan Taylor looks at another unusual experience in the studio and presents a local band that even curmudgeon me enjoyed; WL Woodward continues the joy with his tale of growing up together with Stevie Wonder; and I examine the origins of Black Friday and the history of legendary audio company, Weathers.

Jim Smith presents the finale of his Subwoofery series---but don't worry, he'll be back. Darren Myers has new DIY projects in the works; meanwhile, I invite like-minded readers to share their projects with the rest of us. Richard Murison is back---again!!--- with good news for iTunes-using classical music fans; and finally, the issue is rounded out by another amazing reader system.

Until Copper#21—enjoy!

—Leebs.
We were just sitting there, listening to music. My friend Bernard the Cellist had come to town and I couldn’t help showing off my system. Someone suggested we hear some Mozart. Like the *Requiem*, perhaps?

So I pulled out an old SACD of a live performance from Nikolaus Harnoncourt, Vienna 2003. First we heard my favorite part of the recording, the opening measures and the trumpets’ entrance:

I’ve shared this bit with *Copper* readers before. Isn’t it a *killer*? In an instant, the limping strings and mournful winds are drenched in terror. By emphasizing the contrast, Harnoncourt really sells it.

Unfortunately Bernard and I went on listening, and only too soon we heard *this*:

At which point Bernard turned to me and intoned fatal words: “*Precious*. It’s merely precious.”

He did not mean this in a good way. Worse, I knew immediately what he did mean. I had forgotten just how eccentric, even fussy the performance became once it got past that thrilling brass entrance. I’d forgotten, because long ago its eccentricity led me to shelve it and never listen beyond track 1 again. What had possessed me to play it for Bernard?
I mean, this is a guy who can rail for ten minutes at any conductor who dares to change Beethoven’s implicit bowing directions for the famous motive from the Fifth.

“It’s bowed up-down-up-down. It’s always up-down-up-down! It’s that way in the first movement! All the way through, dammit! And the scherzo! And the finale! Up-down-up-down! Up-down-up-down!” Bernard is not big on whimsy, or “personality,” or “interpretation.” If it’s not up-down-up-down, it’s precious.

This issue tends to infect classical music more than other genres. No one has ever accused Elton John or Katy Perry of giving a mannered, eccentric, or precious performance. Wretched excess is arguably what they do best. And, since they are the creators of their own performing personas, they can be just as mannered, eccentric, or precious as they want to be. You don’t get to say which one of Elvis’s sequin-studded jump suits was, like, too over-the-top.

But if you perform Mozart, watch out. You’re supposed to honor the composer’s intentions, be faithful to the score. You and Chopin or Stravinsky or whoever are expected to execute a version of the Vulcan Mind Meld, to respect John Lennon’s dictum: “I am he as you are he as you are me and we are all together.” Those folks who bought tickets to hear you play? Ha! They actually want you to channel a dead guy. Don’t get carried away.

This is a relatively recent value. Before the advent of Arturo Toscanini (1867–1957), classical artists were allowed to be just as crazy-subjective as Lady Gaga. Okay, maybe not “just as,” but. Toscanini’s contemporary Leopold Stokowski could really put on the dog, and before him Ignace Paderewski could do the Locomotion, and way before them there was Nicolò Paganini, reputed to have sold his soul to the devil. Classical music owns a long history of crazy-subjective musicians.

Toscanini helped change all that. He promised to deliver nothing but the notes, just as Beethoven or Brahms had meant them to be delivered: absolute fidelity to the composer. (I almost slipped and wrote “absolute sound.” My, my.) Arturo T and the NBC Symphony built a reputation on that narrow definition of integrity. The emerging middle-class audience for classical music lapped it up. It fit their notion of value for money, of secure investment in a stable commodity. None of that flashy, unpredictable merchandise for us! Don’t get precious with my Dvořák!

Here in the 21st century, we have apparently become broader-minded. It’s partly due to Harnoncourt. David Allen’s recent essay in the New York Times draws certain parallels between his career and that of Pierre Boulez—like Toscanini, an advocate for literalism—but Allen misses the boat in one important respect: their attitudes toward personal interpretation differed radically. For Boulez, no interpretation was the best interpretation. Increasingly during his long career as a conductor, he blanched out every drop of emotionality from any work he performed, forcing audiences to focus on the music’s architecture, its pitches, rhythms, and textures, while divorcing it from the human psychologies that had arranged them. In contrast, Harnoncourt couldn’t let a measure go by without applying more spin than the material could reasonably support. Results were undeniably personal, yet alienating in almost equal degrees: mannered tempos and tempo changes; hysterical dynamic contrasts; fussy articulations where none seemed necessary.

Where should the line be drawn? How do we know when we’ve left Planet Goldilocks and entered the realm of Tim Burton?

All I can do here is offer a case history or two. In the end, it’s your call.

Let’s begin with the Korngold Violin Concerto. After putting the score aside for several years, noted film composer Erich Wolfgang Korngold completed this work in 1945; it was premiered by Jascha
Heifetz, also resident in Los Angeles, who recorded it with conductor Alfred Wallenstein and the L. A. Philharmonic two years later. Here are its opening measures:

Many critics still think of Heifetz/Wallenstein as the definitive recorded performance. But here’s another that came out just this year, featuring violinist Vilde Frang and the Frankfurt Radio Symphony conducted by James Gaffigan. Same passage:

Obviously a better recording, and both conductor and soloist brought out some nice things that weren’t as apparent in the premiere performance. Here’s one more reading, from Anne-Sophie Mutter and the London SO conducted by André Previn (Mutter’s husband at the time), no stranger to film music himself. You would expect their collaboration to produce something special, which it did. Same passage:

What’d you think? Which interpretation did you find most satisfying? Which could you live with longest? Could you slap a label like “underdone” or “overdone” on any of them? Does any particular facet of any interpretation seem mannered?

One of those two performances won a Gramophone Award. Some reviewers heaped scorn upon the other one because they heard excessive schmaltz. Which was which, do you think?

Let’s end with what I hope is a less ambiguous example of mannered performance. Here pianist Zhu Xiao-Mei performs some of the C-Minor Fugue from Bach’s Well-Tempered Clavier II:

And here is Glenn Gould offering his interpretation:

There you go. One pianist balances structural clarity with as much music as possible, while the other turns it into a strained classroom exercise in which the listener is more or less told what to hear.

That second interpretation? I do think it’s precious.
2016 has been a helluva year. You know: the list of musicians and music-related people who have passed, in any one year, would be too much: David Bowie, Paul Kantner, George Martin, Prince, all of them giants; now Leonard Cohen, who went the day before the election.

But this past Sunday came, for me, the hardest departure of the year: Leon Russell. Most of these deaths are really too big to write about. I’ve tried to say something about a couple of them, but this one is very difficult --- mostly to feel adequate to the task. He’s not the reason I play – that’s due to the Beatles and George Harrison. But he was the first act I saw at the first big show I went to --- watching him, it all came together; he and his band made it all make sense to me. I can, at the very least, try to give you a sense of what aroused me so much.

It was at a Ten Years After concert, in November of 1970 (at the Spectrum in Philadelphia, where the 76ers and the Flyers played). TYA were very big after the documentary film Woodstock, and their phenomenal performance there, and I think they were great – at least I think so. The other “support” act was Procol Harum, who were also terrific --- I think. But the truth is that after seeing the opening act I could barely remember them. What Leon Russell and his band did was so extraordinary to my ears --- not only hadn’t I ever heard anything like it, I didn’t even know it existed.

Maybe he came out unannounced. I don’t remember that detail. But he sat down at a (real) piano, I
think a 9-foot Steinway, and despite my 13-year-old seen-it-all (but really nothing of course) mind, quickly overcame my cynicism. He did four or five songs by himself. And then his band came out: Don Preston on guitar, Chuck Blackwell on drums, Claudia Lennear and Kathi McDonald singing, and the amazing Carl Radle on bass. I had just started playing --- all I really knew was Jack Casady, which is plenty; but to see Radle play before I knew who he was... well, I definitely learned that night.

And watching Claudia Lennear move, well --- I was 13, and what I felt watching her has lasted a lifetime --- I learned about that, too. It’s rumored that it’s she who “Brown Sugar” was written about, before she took up with David Bowie.

But Leon: I learned a bit later on that he and Delaney Bramlett were primarily responsible for infusing gospel music into white people’s rock and roll. I had never heard it, and never heard of it, but the people I loved and admired certainly did. (George famously went on the road, as L’Angelo Misterioso, with Delaney and Bonnie in England when they went over there)

It was utterly astonishing, in the first year of my playing, to hear Leon’s gospel-inflected piano --- its rolling left hand, its skipping right hand. I feel incredibly fortunate to have just stumbled across his extraordinary music when I knew so little.

He came to Hollywood from Tulsa, and fell rapidly into what we’ve called, in recent years, “The Wrecking Crew”. A YouTube search brings up so much stuff; these are just a few highlights. A little background:

http://www.youtube.com/watch?v=GlYx59c8Jzk
http://www.youtube.com/watch?v=pCTw3nRG4lw

During the period when I first saw him:

http://www.youtube.com/watch?v=4bwMqliLXZQ

(I assume Radle is off being a Domino, at the time).

And of course, from The Concert for Bangladesh:

http://www.youtube.com/watch?v=nkKwA25E3YE
http://www.youtube.com/watch?v=T3D68KWfZOo

In the years since, my circle of friends has grown to include Jim Keltner, who says he owes his career to Leon --- I’ve heard stories about him from time to time, and a little bit about his health. He was famously “rescued from a ditch by the side of the road of life” by Reg Dwight. Some of us knew of the connection, which is most audible on the first (US) album, Elton John. http://www.youtube.com/watch?v=Fi0xN499IXE

So many of us owe Leon so, so much.
I wondered when the term “Black Friday” came to mean the launch of the Christmas/Hanukkah selling season on the day after Thanksgiving. In my mind, “Black Friday” referred to the 1929 stock market crash in America. Typical of my understanding of history, I got it wrong: that crash started on Black Tuesday, October 29, 1929. Oops. Way to go, Leebs.

“Black Friday” apparently was a descriptor first applied to the panic of 1869, which broke on Friday, September 24, 1869. But---all audiophile geeks know Steely Dan’s song of the same name, which says:

When Black Friday comes
I stand down by the door
And catch the grey men when they
Dive from the fourteenth floor

---in 1869, there weren’t any buildings that had 14 floors.

Yes, I checked: I am that obsessive. And “grey men” would seem to define 20th century grey-flannel-wearing businessmen, and plummeting from skyscrapers was something that occurred in the Great Depression. So...let’s just assume that “Black Friday” was the end of the first week of the stock market crash in ’29.
But what about that shopping thing? One story is that every year Philadelphia would be overrun by suburbanite shoppers in town for the Army-Navy football game, always played on the Saturday after Thanksgiving. By the early ‘60’s, the term "Black Friday" had stuck in Philly; it was not meant in a positive way, but was indicative of the dread felt by both law-enforcement and by shopkeepers.

Somehow---and if there's agreement on just how, I can't find it---by the late '80's the term had gone nationwide. The story/myth/explanation had appeared that what the term "Black Friday" really meant was that merchant profitability was so dependent upon holiday sales that they remained in the red---running at a loss--- until Thanksgiving weekend---after which, sales were in the black, or profitable.

Personally, I call BS on that version. The idea of running a business at a loss for eleven months, hoping against hope that the year will be salvaged by a magical weekend or two, strikes me as insane. I suppose it's possible, but I'd hate to think it's commonplace.

While giant-ticket audio products may not benefit from Black Friday, Cyber Monday, et al, ad nauseam---it's generally the strongest sales period for consumer electronics as a whole. The Consumer Technology Association---y'know, those folks who used to be the CEA---projects that 68% of Americans, about 170 million of us, will spend over $36 billion during the 2016 holiday season. That's about $212 per person. That may not buy a new pair of Magicos, but it's a fair amount.

Personally, I plan to spend the holiday with my family, and not with a bunch of over-caffeinated fellow shoppers. But to each his own: if you need this as justification to buy yourself a new system, have at it!
Back in 2000, Dr. Michael Unser of the Swiss Federal Institute of Technology in Lausanne, published an interesting technical paper entitled “Sampling – 50 years after Shannon”. In this paper he considers the state of the art in digital sampling. It is not a puff piece. It requires a post-graduate level grasp of mathematics if one is to follow it in any serious detail. It mostly goes over the top of my head, for starters. But in doing so, it makes some interesting points, including the dry observation that the so-called “Nyquist-Shannon” theorem handily predates both Nyquist and Shannon!

One key finding is as follows. It reduces the problem of regular digital sampling to a ‘general theorem’. In other words, all methods of digitally sampling a continuous function will be subsets of this general theorem. It goes something like this:

All continuous functions (such as waveforms) can be represented as the sum of a number of “orthogonal functions”. Orthogonal functions are like the X-Y-Z axes of a co-ordinate system, where an object’s location in three-dimensional space can be unambiguously specified by its co-ordinates, given by its positions along the X-axis, Y-axis, and Z-axis. If the object moves purely along the direction of the X-axis, then it’s Y-axis and Z-axis co-ordinates will remain unchanged. In fact, I can change its position along any one of the three axes without affecting its position along the other two. It is this property that makes the three axes “orthogonal”. The same property makes for “orthogonal” functions – you can independently change any one of them without affecting any of the others.

An example of this would be the frequencies of an audio signal. I can change the amount of the 1kHz frequency content, and it will have no impact on any of the other frequencies present. The
frequencies – or more specifically the sine waves exhibiting them – are therefore “orthogonal functions”.

Usable families of orthogonal functions can range from simple to very complex. The set of families of orthogonal functions may even be infinitely large. The simplest members are base functions such as sine waves. For sine waves, Unser’s set of coefficients is obtained by performing a Fourier Transform. Slightly more elaborate families include such things as “wavelets” which are best described as short bursts of sine waves; and Splines, which are best known as curve-fitting functions. Much interest over the past 20 years has been focused on wavelets, and it seems likely that this will accelerate in the future, as the computing power required to use them to their best advantage becomes more commonplace.

Unser’s paper tells us how to examine any set of orthogonal functions to determine whether they are suitable for representing a waveform. Unfortunately, the test itself is mathematically obtuse, and does not lend itself to a pithy description in plain English. But if a set of orthogonal functions proves to be suitable, then our waveform can be fully represented by determining a corresponding number (in mathematical terms a “coefficient”) for each of the orthogonal functions. We can then store those numbers, and use them to fully and accurately reconstruct the waveform at some future time.

Unser’s general theorem of digital sampling, and he uses it to ask and explore some very interesting questions, ones which may well prove to be useful in the near future. But before discussing that, we’ll just take a quick look at how Nyquist-Shannon sampling theory fits into it. Suppose we choose as our family of orthogonal functions the $Sinc()$ function:

$$Sinc(x) = \frac{\sin(x)}{x}$$

As it happens, when we work out what the corresponding coefficients are for the $Sinc()$ functions, they turn out to be the real values of the waveform itself as it evolves with time. In other words, turning the whole thing backwards, if we sample our waveform in time, the resultant sample values will be the coefficients of an orthogonal family of $Sinc()$ functions which can be used to exactly reconstruct the original waveform.

I have stated glibly that we can choose any family of orthogonal functions which meet some incomprehensible criteria, and fully represent our waveform by storing only the coefficients of these functions. However, this is of no practical use if our family of orthogonal functions is infinitely large, because we’d then have to store an infinitely large set of coefficients. This is where the concept of “bandwidth limitation” comes in.

We are familiar with the Nyquist Criterion, which states that our waveform must contain no frequencies above one half of the sampling rate. In the context of Unser, this means that by reducing our infinitely large family of orthogonal functions to a finite set – such as by eliminating all those which correspond to frequencies above our Nyquist Criterion – we can represent our waveform using a finite set of coefficients. We can apply this kind of logic to any family of suitable orthogonal functions. By appropriately reducing the size of the family to a finite subset we will end up with a finite set of coefficients. The smaller this set can be, the fewer the amount of numbers that would be needed to fully represent the waveform.

For the most part, this analysis appears only to be of use for the purpose of data compression, where it has limited applicability. At the end of the day, information theory already tells us most of what we need to know to determine just how much compression can actually be achieved. But where Unser’s paper gets really interesting is where it heads next.
Unser invokes the Physicist’s “frog on a lily pad”. This is where a frog attempts to cross a lake by jumping from lily pad to lily pad. Each lily pad is exactly half as close to the far side of the lake as the previous pad. The mathematician says that the frog will never reach the other side, but the Physicist observes that at some point the gap will be so small as to be meaningless. Unser recognizes that there is a distinction between a mathematically exact representation, and one where any errors in the representation are practically irrelevant.

Before you get too excited, Unser does not take us anywhere immediately usable with this analysis. He merely illustrates some ways in which this observation can be taken into account within his general theorem. But the concept is an intriguing and useful one. [It has been suggested - or rather hinted at - that some of these principles may be at play within Meridian’s controversial MQA technology, but at the time of writing MQA’s inner workings remain undisclosed.] As an example, conventional Nyquist-Shannon theory requires strict bandwidth limitation, but practical anti-aliasing filters can never be perfect. Unfortunately, the “better” the filter, the worse its time domain (i.e. phase) response will be. Unser’s analysis may provide a mathematical framework within which practical issues such as this can be formalized.
There are some brands whose influence extends far beyond their ownership base. When it comes to cars, I think of Alfa Romeo: nearly everyone has some sort of emotional connection to the brand, even if they never owned, drove, or even rode in an Alfa. They had a friend who owned one in college, there was that girl who used to drive a Spider with her long hair streaming behind her in the breeze, or there’s that connection to *The Graduate*. Amongst owners, there tends to be a certain wistful regret that they ever sold theirs, in spite of horrible unreliability, massive rust, whatever. There is still that tug at the heartstrings.

In vintage audio, mentioning the name Weathers provokes similar responses. For a brand that vanished a half-century ago, there is a surprising amount of recognition, even if that recognition borders on myth. Through the years, I’ve encountered geezer-philes (meaning audiophiles who are *even older than me*) who maintain that a Weathers cartridge provided the best sound they ever had in their homes.

But that’s getting ahead of the story.

According to a bio in the May, 1962 issue of *Audio*, Paul Weathers studied electrical engineering at Indiana University and at Purdue. Following graduation, he went to work for RCA in New Jersey in 1929—-which would have put his arrival shortly after that of legendary engineer Harry F. Olson. Weathers worked first on sound for the new-fangled talking pictures (as did Olson. Wonder if they ever worked together?), then moved into sound reinforcement and public address design, including design of systems used at the overlapping 1939 World’s Fairs in New York and San Francisco. Weathers worked at RCA until 1945, at which point he was serving as Product Manager of the Sound Department.

In 1950, Weathers Electronic Industries began operation, initially offering design and development
services for electronics manufacturers; the company was also involved in OEM manufacturing of amplifiers for electronic organs. In June of that same year, Weathers presented a "technical paper on a new type of phonograph pickup" (a paper I've been unable to find in print, BTW—it wasn't in the AES Journal or any similar contemporary journal that I can find). Continuing the quote: "Instead of the usual piezo-electric or magnetic type of cartridge, his pickup was a frequency modulation unit—in essence a miniature FM transmitter, employing an oscillator and demodulator in circuit. Because the stylus in the cartridge merely traced the lateral modulations in the recordings (mono—remember?), rather than performing any mechanical work which resulted in mechanical impulses, the cartridge and the associated specially designed arm was capable of tracking at the stylus force of one gram."

Keep in mind that at the time, most cartridges tracked at 6 grams or more, and record wear was a genuine problem. Additionally, the low moving mass enabled better tracing of high frequencies, and resulted in lower distortion.

By 1952, the "Weathers One-gram capacitance Pick-up" was commercially available, although the product's appearance was as clumsy and homespun as the product name. An ad in the April, 1952 issue of Audio Engineering (the precursor to Audio) showed a clunky-looking cartridge and oscillator unit, both emblazoned with a 1930's-looking Art Deco logo. The breathless text offered "AT LONG LAST---REALISM without noise!" The system came "complete with ultra-flexible cable, oscillator unit, tube, installation hardware and instructions" for $37.50. Oddly, the required power-supply was sold separately for an additional $14.50.

Both product and presentation bespoke the touch of an engineer, not a marketer or salesman. In some ways, that was good: subsequent reports indicated that the performance claims were accurate. Other reports indicated a tweakiness, an instability of the oscillator unit, that made the cartridge not quite ready for prime time. More breathless prose appeared in a "Tested in the Home" product review in the Summer, 1952 issue of High Fidelity: "At the Audio Fair in New York last Fall, Paul Weathers exhibited his 1-gram pickup....The sound ...was exceedingly fine, and it...caused a furore at the Audio Fair. We have since received many reports from readers: all have been favorable....Mr. Anglemire wrote, 'We wish to report that some time ago, we had an opportunity to try out the Weathers pickup and found it out of this world!'"

These were simpler, less-jaded times.

Judging by the High Fidelity ad in late 1953, the company had realized the need for products and ads that conveyed at least a modicum of sophistication. The FM pickup system was now offered with a sinuous wooden tone-arm with brass escutcheon and trim. The "Debonnaire" turntable package which included the pickup and arm was still rather industrial looking. 1954 ads showed a still-kludgey-looking cartridge, with that godawful logo—but the text had become a little less hyperbolic: "Its richness of tone and absence of record scratch will amaze the most critical listener."

The next few years would bring a surprisingly wide range of products, and all were clearly the result of Weathers' unique insights as to what phono cartridges/turntables/amps/speakers should be, rather than just copy-cat designs.

The company's products and ads developed a definite visual flair, as seen in the ad below. Next time, we'll delve into the company's continued growth, and look at how—through a curious turn of events—Weathers encouraged the birth of one of our best-known and longest-lived audio magazines.
I remember vividly the first time I heard ‘Sir Duke’ from *Songs in the Key of Life*. It was the fall of 1976 and I was driving across the bridge between Windsor Locks and Warehouse Point over the Connecticut River. There is still a bridge there, but the old bridge has been replaced with a flat ugly highway bridge. This bridge was one of those riveted steel span jobs. If you walked across it you could feel it sway with the cars. That’ll keep yer feet moving. The bridge looked just like this one.
Wait... That be the old girl herself! The walkway to the right was a trip. Luckily there weren’t shit in Warehouse Point or Windsor Locks for that matter, so we didn’t have much reason to brave it. Also Windsor Locks at the time had a population of about 12. My Mom was born there and she knew every S&H Green Stamp-carrying member of the Guard. You had to cross that bridge without someone seeing you, because they WOULD call your mom. If you were crossing that bridge you were ‘up to no good’. And if you were smoking a cigarette, you’d end up chained to a cold steel pole in the basement. That was the story anyway.

The Connecticut River at this point moves so fast, and was by the late 1700’s such a major thoroughfare, that in 1827 400 Irish workers were hired to build locks just north of the old town of Windsor to bypass the temper tantrums of that section of the river. Hence the town where those locks resided was named Windsor Locks. They were an imaginative bunch back then. I bet if you asked those Irish workers they had a much different name. By the way, I’m half Irish and so was almost every kid I grew up with. Just sayin’.

But in the fall of 1976 the old bridge wasn’t keeping my feet moving. It was a new hit on the radio, ‘Sir Duke’. That back beat and funky horn parts with Stevie hollering was beautiful and really a revelation. My favorite part is the bass. But that’s a story for another time.

httpv://youtu.be/6sljSNTS7Fs

Stevie had always been a hitmaker, since he was like 12. We’d heard the hits he had on the radio, and that had become a part of our generation’s lexicon like all of Motown. But in ‘68 to ‘70 we were listening to **Led Zeppelin, Deep Purple, Mountain, Frank Zappa**. ‘My Cherie Amour’ was a great song, but that stuff was beginning to sound more like where we’d been and less like where we were going. Yeah, the guy was a beast. He’s sold 100 million records with 49 Top 40 hits, 34 Top 10 hits, 12 Top 10 albums, and 22 Grammys. He owned the Grammys in the 70’s, to the point where **Paul Simon**, on accepting a Best Album award in 1975, thanked the usual group of monsters and moms and ended with “And I’d like to thank Stevie Wonder for not releasing an album this year.”

It just wasn’t what we were looking for...exactly. In 1972 (high school graduation, it’s amazing I remember anything from that year), Wonder released **Talking Book**. ‘Superstition’ hit the radio and we sat up. This was interesting. But the same album had ‘You are the Sunshine of My Life’. Again, great song, but we sat back. In August 1973 he brought out **Innervisions** and we stood up. With
stuff like ‘Higher Ground’, ‘Too High’, ‘Don’t You Worry Bout a Thing’. And ‘Living In The City’. Must be played LOUD.

http://youtu.be/rc0XEw4m-3w

My son in his 20’s plays in a R&B fusion band, and that song is still a staple for them. Testament to legacy, and bringing kids up RIGHT.

A few things about the man. Three days after the release of *Innervisions*, Stevie was sleeping in the passenger seat of a car traveling between gigs outside Durham NC. The logging truck they were following hit the brakes suddenly, and their car slammed into the back of the truck. A log broke loose and crashed through the windshield on Stevie’s side and hit him in the face. In the face. A log. In the face. He was in a coma for days, his head swollen to 5 times its size, with a lotta worried people with various agenda around him. One was Ira Tucker the tour director. He asked the doc if he could sing to Stevie, the first day no response. On the next day Tucker was singing ‘Higher Ground’ into Stevie’s ear as loud as he could, and Stevie started tapping in time on Tucker’s arm. After Stevie came to, they brought him a clavinet. Stevie was afraid to touch it, not knowing if he still had it in him. He did. He lived, and we breathed. He would be on meds for more than a year and suffered from debilitating headaches. Right. But the following March he made an appearance at an Elton John concert at Madison Square Garden, and he in Wondrous style moved on.

This was a kid that never let anything stand in his way. He always knew what he wanted, and he went after it. At 7 years old his brothers and friends used to ‘fly’ by jumping from storage shed to storage shed in a row in back of their apartments. Stevie counted the steps and flew with them. His Mom, Lula Mae Hardaway, an icon in her own right, let him be. But there’s a story about his Aunt Iona coming over to watch him. She checked the back yard, saw him flying, and nearly had a stroke.

He had his first paying gig at 8, and signed a contract with Berry Gordy and Motown when he was ten. It was obvious to everyone who heard the kid how special he was. Blindness had nothing to do with it. It probably got him in some doors, and Little Stevie was not above using it. But his talent shook loose any thought of making this kid a novelty act. And he could play that harmonica. He’s played on numerous albums for other people and you can always, always tell when it’s him.

In the early 80’s he took time off touring to spearhead a campaign to make Martin Luther King’s birthday a national holiday. That was accomplished when Reagan signed the bill in 1983. Coretta King said without Stevie Wonder it wouldn’t have happened. On record and off, Stevie Wonder had become our generation’s conscience. Surely he was no flippin’ saint, never was, and we knew it. There are few of us saints out there. How wonderful to be growing up together.

In 1976 Wonder released *Songs in the Key of Life* with Michael Sembello session guitarist extraordinaire (!!). It won three Grammys, one for Album of the Year. Since then every album seemed to be a milestone, an experience to listen for the message. He performed with everybody, recorded with everybody, and makes us smile to this day.

In 1979 Wonder wrote a score for a movie *The Secret Life of Plants*. He had the producer describe the visual scenes so he could translate them into sound. The subsequent album *Journey Through ‘The Secret Life of Plants’* is one of my favorites of his. His experiments with sound here are remarkable and sometimes even Zappa-esque.

On a final note. Let’s listen together and pray we never really grow up.

http://youtu.be/KWhMyOs0pCQ
How bout a bonus?

httpv://youtu.be/hYKYka-PNt0

Hey Stevie. Thanks for hearing.
Those of us who are Classical Music fans are used to being left behind to pick up the scraps as the march of technology moves relentlessly on. It wasn’t always so. In fact, the birth of the long-playing record was driven by the fact that much of classical music took the form of lengthy and elaborate works. By contrast, the popular music of the day came in short, punchy and snappy song forms. However, by the time the 60’s were over, popular music had taken to the album format and assumed it as its own. Classical music has seen the short end of the stick ever since.

So imagine my surprise when the latest update to iTunes (version 12.5.3 for both Mac and Windows) contains quite a significant addition for Classical Music listeners. Having said that, the feature is pretty well hidden, and there are no announcements by Apple trumpeting the new feature to the masses. But Apple marches to the beat of its own drum – they are leaders rather than followers, and when a significant new feature like this comes along, you have to wonder what it signifies for the future.

So what is it? Well, the first indication is something that is easy to miss. If you select a single track and choose “Get Info”, you are presented with the metadata for the track. The first item is “Song”, and if you look closely, you will see that it now has an up/down arrow symbol next to it. But you
won’t look closely, and you won’t see it. It is only when the second indication comes along that you will sit up and take notice. If you instead select multiple tracks and choose “Get Info”, this time the very first item is a checkbox labeled “use work and movement”. Now you’ve got my attention!

Let’s take a sort-of-typical Classical Album as an example of why this useful and how it works. This album comprises Holst’s ‘The Planets’ coupled with Britten’s ‘Four Sea Interludes’. Here is a screenshot of how this album looks on my iTunes desktop:

You can see that there are two unrelated works on the album. This gives rise to a typical question – What is the name of the album? It is both cumbersome and impractical to call it “Holst: The Planets; Britten: Four Sea Interludes” or some variant on that. My personal preferred solution is to give the album a title using the main work on the album – in this case The Planets. But I want to be able to differentiate it from other recordings of The Planets, so my standard practice is to call it “Holst – The Planets (Bernstein)”. You may approach this problem differently, but that’s what I do. Since the name of the album contains the title of the work, I can name each individual movement by its title, such as “Mars, the Bringer of War”. Now everything looks tidy. However, Britten’s Four Sea Interludes gives me a problem, since they are not movements of The Planets. My solution, therefore, is to name those four tracks using “Britten: Four Sea Interludes – “ followed by the titles of the individual movements. You can see the result in the screenshot above. It’s clumsy, perhaps, but it works.

Time to use this album to experiment with the “use work and movement” feature. So I select all seven tracks from The Planets, and choose “Get Info”. Next, I check the “use work and movement” checkbox. Here’s what appears:
Where there was previously one entry “song”, we now get entries for “work”, “movement [ ] of [ ]”, and “name”. I enter ‘The Planets’ into “work”, but leave the others untouched for the moment, and click OK. Then I do the same thing for the four ‘Britten: Four Sea Interlude’ tracks (this time I enter ‘Four Sea Interludes’ as my “work” entry). Here’s what we end up with:

Clearly, this isn’t what I had in mind. You would have expected the individual names of the various movements to show up, but instead the Work name is replicated in each field. Clearly this is a bug that needs to be addressed in a future update. For the time being, therefore, each track has to be edited individually to correct this problem.

The process is simple, but tedious. You edit each track individually, by selecting the track and choosing “Get Info”. Now you will see that the top line says “work name” followed by an up/down arrow symbol. Click on the arrow symbol and choose “song”. The field will revert back to the original track title, such as “Mars, the Bringer of War”. Select that and copy it. Click on the up/down arrow symbol again, and this time choose “work name”. It will revert back to the previous configuration, and you can paste “Mars, the Bringer of War” into the “name” field. Finally, if you like, you can fill in the “movement [ ] of [ ]” fields with the appropriate values. Here’s what it will look like:
Repeat the process for all the tracks in the album. Now you will have a much more useful representation of this album:

I think this layout makes a lot of sense, and shows indications of having been carefully thought through. For example, notice that the header for each work has grabbed the Composer from the composer field of the metadata. Notice also that the name of each individual movement is preceded by a Roman numeral. This is taken from the first number you entered in the “movement [ ] of [ ]” field. If you didn’t enter a number, the Roman numeral is omitted. As yet, the second of those numbers doesn’t seem to have a visible presence. I also checked that it is smooth and trouble-free to switch between this new mode and the conventional mode by toggling the “use work and movement” field, and indeed it appears to switch back and forth in trouble-free fashion.

I use a serious metadata editor called Yate to keep the metadata in my audio files in a careful semblance of order. If I use Yate to examine the metadata on the files subjected to this new treatment, I find that it shows all of the new data in fields identified as “Work name”, “Movement name”, and “Movement [ ] of [ ]”, and in addition there is a checkbox for “show work name in iTunes”. So clearly, the metadata is being stored in a manner that at least one serious metadata App house is familiar with. I asked Barry at Yate (the go-to guy for all things metadata) for clarity on this, and indeed there is more to it than meets the eye. For Apple Lossless files (m4a) this new data maps directly to existing metadata fields, and everything works smoothly. However, with MP3, AIFF, and some WAV files, which use the ID3 format for metadata, Apple plays fast and loose. They
shoe-horn the new data into the “Grouping” field, which is already widely used in the (mostly non-
Apple) community to hold other custom data. For most people, though, this won’t be a problem in
practice.

So, in summary, what appears to have been added to iTunes without fanfare is a seriously thought-
out extension of the iTunes internal database with Classical Music users in mind. The one bug I
have highlighted will surely be fixed in an upcoming update (surely, surely, surely?). There are
other bugs, too. For example, if the Artist field differs from track to track within a movement (for
example, to indicate featured soloists), this is not handled correctly in the display. I have also
encountered an instance where one track refused to agree to become part of a “work and
movement” grouping, and I could only get it to behave by individually editing its metadata in Yate.
Teething pains, one hopes.

I am intrigued as to what this all means. Are there going to be further expansions of iTunes’ ability
to handle classical music? I’m thinking of explicit fields to hold orchestra, conductor, and featured
soloists. In addition, I will be looking for iTunes to be able to use those new fields to improve
navigation through the database. I mean, we are currently able to sort by ‘Artist’, ‘Composer’, and
‘Genre’ – why not ‘Work’, ‘Conductor’, and ‘Orchestra’? I have to believe that if Apple has gone to
the trouble to implement these initial new features, it is more likely than not that there is more to
come.

So, all in all, a very worthy development. Unfortunately, given the nature of the bug I described in
detail – whose workaround is heavy on manual labor – I doubt I’ll be taking full advantage of it in the
near future, since my library has over 3,000 albums. But I guess for the time being I’ll probably
make use of it on all new additions.
Darren Myers' Make It Yourself articles, run in Copper issues 15, 16, and 17, are among the most popular articles we’ve ever run. Unfortunately, projects take time to develop: plotting, postulating, obtaining parts, documenting the project, building it and then writing about it and photographing it....

You get the idea. Besides which, there's that whole "day job developing new products" thing. We will be running some cool projects from Darren in the near future, but we know there's an appetite for more, here and now.

We know that a lot of our readers are experienced DIY-ers, having built amps, speakers, even DACs and turntables. So: do you have a project that turned out really well? Do you contribute to DIY Audio? Were you an ardent reader of The Audio Amateur or Sound Practices?
Did you attend Burning Amp, or the European Triode Festival?

Would you like to share your experiences? Can you at least kinda-sorta write, and take clear photographs?

We've got space for you. Pay is basically beer at audio shows---but think of the fame! The GLORY!!

I personally invite you to submit ideas. Something that’s already done, which you just happened to document obsessively, would be ideal. Beyond that---let’s talk! I look forward to hearing from all y’all. Let's get this started!

Cheers, Leebs
Subwoofery: The Finale

Written by Jim Smith

Electronic Adjustments

Ok, now that we’ve accomplished the basic (pun intended, sorry!) steps, we are on the home stretch. These final steps require personal choice/taste as well as some technical adjustments.

In the following sequence, we’ll be looking at sub balance (tech), sub volume level (tech/taste), sub polarity (tech), & sub fine-tuning at the crossover point/level (tech/taste), & crossover techniques (tech/taste)

Now, turn off the main loudspeakers.

Sub balance -

Now that the position/angle of the subs have been determined, we need to get them to operate with the same relative level in each channel. For each sub, choose a similar crossover point - a bit higher in frequency than you think you will be using. For example, if you expect to crossover at 35 Hz or so, choose 45 Hz for the initial balance. Set the sub level at about 1/3 of the total available volume. Check each sub’s output individually. This is best done with a SPL meter, but it can be done by ear. You want to get them as equal in output as possible. When you have their individual acoustic outputs equal/balanced, it’s best to mark or record the volume setting. You’ll be turning the pair up or down shortly, and you want to make equal adjustments if possible.

Initial sub volume level -

Using some music tracks, such as the Brian Bromberg Wood or Wood II recordings (or others that have variable bass notes and that seem to be a well balanced bass recording), raise or lower the subs’ volume equally until the bass response is fairly smooth, not obviously too much or too little bass. We will get to fine adjustments after a few more steps.

Now, turn on the main loudspeakers.

Sub polarity -
This step can dramatically affect the results of the next steps, so it should be addressed at this point. I have found that it is unpredictable depending on many variables in the set-up. We only care about the outcome, not the reasons why.

We want the subs to work with the mains rather than against them. Improper acoustic polarity is an example of the mains & subs fighting against each other. It will result in diminished bass at & near the crossover point.

This aspect should be measured or listened to at the listening seat, not between the subs or elsewhere.

Play some pink noise if you have it. Measure the output in SPL, or if you are using a RTA, look at the crossover point/bass region and note the shape of the response. Then reverse the polarity on both subs and run the test same test again. One or the other polarity will have noticeably less output in the crossover region. That is incorrect – the speakers are out of phase at the crossover point and thereby cancelling the natural acoustic frequency balance of the recording. Note: this test can be performed by ear but it is a bit trickier.

Finally, some subs have infinitely adjustable (variable) polarity. I would start at ‘0’ or ‘180’. Then I might check the response at ‘45’, 90’, & ‘135’. You are looking for the setting that increases the output at the crossover point. You may see a difference or you may not. As before, you are picking the overall best polarity.

The reason we set polarity now is that we could possibly make crossover/level adjustments in the next step that are incorrect, and this would affect the smoothness of the subs/mains integration.

**Sub fine tuning - crossover point & volume level**

This step assumes that you are NOT using an electronic crossover. The mains are playing smoothly through their range.

The crossover point on the subs that we were using for the balance test needs to be brought down to a point at which we think we will need to bring in the subs. We will make this final adjustment by ear.

It is critical to note that as you increase the level, you MAY need to reduce the crossover point. Visualize the mains’ response as a straight line. As you increase the bass subs’ bass output, its roll-off will intersect with the mains’ response line at a higher frequency. And vice-versa for the occasions when you turn down the subs’ bass volume.

Sometimes, adjusting sub level slightly is all that is required, but not that often.

In general, do not simply adjust sub volume without remembering that you are also slightly affecting the crossover point. I have encountered numerous sub/main speaker installations that were said not to be integrated smoothly, and when I listened to them, I agreed. Many times, it was an incorrect interplay of the volume and crossover points.

This is a combination of tech info that can serve the music, but only when you - as the owner - exercise your right to have the final call (taste).

This final tweaking of sub level and crossover point may take a bit of time, as you should listen to a variety of your recordings. For example, you don’t want piano lower registers to sound thick. I would mostly address instruments that have contributions in this area.
I definitely would check some recordings with deep bass, but I wouldn’t go for lots of deep bass and subsequently mess up the delicate balance for other instruments that are much more likely to appear in most recordings. This is definitely a matter of taste at this point.

One way to be sure that you have finally settled on the best setting is when you no longer feel the urge to get up and adjust the subs’ level/crossover. If you have followed this info and previous *Subwoofery* articles about subs, and addressed your set-up accordingly, it will happen! Sometimes it takes days to be sure that it is dialed in, but again, it will happen. And your music will speak to you in a more impactful manner than ever before.

*Note* – At this point, I often go back to see if the subs are still balanced in output after making the other adjustments. If they are no longer as balanced as they were, then you should rebalance them now, and then make whatever slight level/crossover adjustments as may be required. Also, I always record & mark the ‘final’; settings. That way, a bit later, when I have decided to try a slight adjustment, I have a known reference point. If I do make a slight change, I mark & record that setting as well.

**Crossover techniques** –

There are those that think that the mains should be crossed over to the subs as well, via an electronic crossover. From a theoretical/technical viewpoint, I agree. It’s just that, *for me*, I haven’t heard any subwoofer crossovers that are transparent enough in the mids & highs. That’s not to say that it cannot happen – it’s simply that I have never heard it.

And sometimes, for whatever reason, those set-ups seem to be the very ones where the subs/mains integration – and thus the musical engagement, is diminished.

If you have such a set-up and it is working for you in the musical involvement area, congrats! My guiding principle is to only recommend that which I have heard & liked. Doesn’t mean that your set-up is compromised at all – it’s just that I haven’t yet heard a similar one that worked.

**Possible pitfalls of electronic eq and/or DSP – plus a true story**

I have two main concerns with EQ and DSP;

1 – *It’s not a panacea*. Some people think that if they get the response relatively flat, or “fix” time arrival and such, that is all it takes. If you wish to use these programs (as I have), don’t even think about it until you have first done all of the basic set-up as I have mentioned. I have referred to this as the *organic* process rather than the *electronic*.

2 – Sadly, I’ve heard all too many systems that sounded *technically correct*, but were *utterly boring musically* because the owner or system tuner felt that once the measurement goals were achieved, they were done. Not so!

So here’s a story that is related to the concept, at least in the area of execution. Some of you may remember the San Francisco *Stereophile* Home Entertainment Show in 2003. If so, you may recall the extraordinary and never-again-equaled response that happened in our (Avantgarde-USA, BAT, Running Springs, etc.) demo room. Srajan Ebaen – *6moons.com* - wrote about it, as well as Robert Harley in *TAS*, and others.

As always at the shows where we exhibited, I voiced that system. We had a couple of less-than-
pleasant peaks in the boundary-dependent-region (below 300 Hz). Expecting some difficulties, I had brought my Rives PARC (Parametric Adaptive Room Compensation), which is designed to solely address that region.

When I mentioned to Richard Rives Bird that I was bringing it to the show, he offered to tweak it with his computer program. True to his word, when I let him know I wanted him to drop by, he was nice enough to come by and run the program.

Richard had a ton of work to do throughout the show. He didn’t cut short his time, but he based his adjustments on near-perfect measurements. Satisfied with the results, he went on to other projects waiting at the show.

There was no question that the response was very flat now. Technically, it was superb. However, after listening for a while after Richard left, I began to feel that the system was missing a bit of musical involvement. The emotional hook was not quite there.

So the result of the correction was flat response. Unfortunately, after I listened later, my response to the music was similar. Flat.

I should mention that we were only using the PARC in the line from the BAT preamp to the amps driving the BASSHORNS. The amps driving the TRIOS were direct from the preamp.

So I spent another couple of hours building on what Richard had done (LOL - Richard might have had a different description). I didn't change the frequency of the three cuts he introduced, but did slightly adjust their "q" (width) and the level of their amplitude.

When I was satisfied, I was feeling good about the sound – the music was engaging at all levels and with all genres. I privately wondered if the subsequent measurements would have been as precise. My guess was -- probably not.

Here’s the cool thing - We got *standing applause* at the end of every demo for three days - an almost-unheard-of response to a show demo! IMO - listeners weren't responding to the technical aspects of the sound, they were releasing emotions stimulated by the musical experience.

FWIW – I have never before (or since) seen such response from show attendees. It was unique in my long experience in the industry. In addition to the original mention, Robert Harley mentioned it in TAS again recently.

I think it might be too simple for an installer of digital room correction systems to rely on the measurements. And indeed there are systems that have remote tuning. Some even offer automated adjustments. But who determines how the system speaks to you, in your room?

A technician onsite MAY have the requisite blend of science and art skills to do it, but not if he thinks the *measurements* are the cure. And even if he doesn’t, can he make the system come alive in a musically compelling manner?

**So I have 3 primary caveats:**

1. EQ/room correction cannot replace getting the system/room basics right before running the program. In fact, it makes what I call "Playing the Room" even more important than ever. If the room correction program is as good as many of us are hearing, completing the system with room correction - after building on a solid voicing foundation - could yield incredible long-term benefits.
2. Even though the outcome may measure text-book precise, I've found that a computer read-out may need a little on-site "interpretation" from the end user or voicing agent in order to fulfill the ultimate promise. This is even more noticeable in so-called "automated" eq systems.

3. So don't think about room correction until you have gotten all that you can from the set-up tips that we've discussed in this Subwoofery series. And be sure you are satisfied that the system performance doesn't depend on a technician, when what you really want is an artistic interpretation of the science behind the sound.

*Umm, weren't there supposed to be 8 articles in this series?*

Hey, I managed to combine the info into seven! Anyway, I have in mind a somewhat-related topic...

**Upcoming -**

*DPT - The Three Critical Steps To Maximize Your Musical Engagement*

See you then!
This room is our masterpiece. A two-channel haven for playback of what we record at Sacred Grounds Studios in North Hollywood, California.

Resolution was the main design parameter in our two channel system. Resolution across the frequency range from 30 Hz. - 12,500 was our top priority. We wanted to be able to hear everything that occurred within that frequency range without any interference from the room. Both the gear and the room had to work together in order to accomplish this high degree of resolution.
Solid state amplification was used with special attention paid to power handling and dynamic reproduction. Bi-amplification is employed throughout using 300 Watt solid state mono blocks.

Lower frequencies were achieved using two 10" drivers with electronic crossovers since lack of consistency in the recording process demands that one has the ability to manage to lower frequencies at will.
Lower frequency pressure technology is distributed throughout all room surfaces along the proper rates and levels of absorption for middle and high frequencies, along with both horizontal and vertical quadratic diffusion for good imaging.

Would you like Copper to publish your system? Write us by email and tell us what makes it special. We'd love to help you share with the rest of the world.
Vøringsfossen is located at the top of Mårbødalen on the western slopes of Norway's Hardangervidda National Park. A blend of two exposures.

"After having shot the base exposure I lifted up the camera to get more of the sky and the top of the right side. What I needed from the second exposure is clone stamped into the base exposure."