

9-2009

## Digital Media Reviews: Pandora [Review]

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### Recommended Citation

Shelley, Anne, "Digital Media Reviews: Pandora [Review]" (2009). *Faculty and Staff Publications – Milner Library*. 6.  
<https://ir.library.illinoisstate.edu/fpml/6>

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230). Although Lord has been receiving such criticism for nearly twenty years, these assessments still hold true. It is questionable whether completeness, accuracy, consistency, and currency—four fundamental goals of any reference work—are even of interest to Lord.

### CONCLUSION

Since its inception, discography has strived for accuracy in miniscule details, with dedicated amateur scholars enumerating matrix and take numbers, identifying soloists, and using a wide range of resources, as opposed to cataloging, where the (often unheard) artifact in hand is generally considered to be the ultimate source of information. Very simply, minutia is discography's *raison d'être*. It follows, therefore, that with discography, "God is in the details" and that since the contents of discographies are minutia, subjecting discographies to microscopic scrutiny is not "nit-picking," but rather meeting the subject on an equal level.

For years I have used Lord's products (among other sources) practically daily. They have value, are easy to use, and the basic organization suffices. However, every single day I also find errors and problems. Some of these are points of intricate research, but others are cases of simple sloppiness, basic ignorance, and poor judgment. One might assume that, given time, things will improve, but unfortunately, at no time have I ever found the errors to be diminishing. It is just as likely that information will be incorrect in the latest entries as in the oldest, and I found problems even in the 2008 sessions that are included. There is little to no quality control in the project. This has always been the case and it seems unlikely to change.

While Lord's product is useful, its lack of high quality information makes additional

resources necessary for double-checking. The CD-ROM compiled by Walter Bruyninckx (each revision results in a name change and this is known currently as *90 Years of Recorded Jazz*, 6th ed.) has an identical mission. It is not as easy to use, but those with a strong interest in jazz research will want to own both. When evaluating the Lord and Bruyninckx products, Tim Brooks concluded that Bruyninckx had better coverage (Tim Brooks, "CD-ROM Reviews," *ARSC Journal* 33, no. 2 [Fall 2002]: 263). The latest edition of Brian Rust's early jazz discography is available on CD-ROM as well. For those interested in recent issues, there are online resources including the All Music Guide (AMG) Web site which provide updates that are equally current and equally mediocre (and AMG even includes composer credits and track timings), and OCLC's WorldCat now has an open Web product. Since the big difference is that Lord's service costs hundreds of dollars and the online projects are freely available to all, it is not unreasonable to hold a paid subscription service to a higher standard.

Users for whom completeness or accuracy are not of paramount importance; who are interested in "some information" or "any answer," will find Lord's products convenient and helpful. Those who desire a resource that is thorough and meticulous will be disappointed. In the end, despite its marketing claims, *The Jazz Discography* cannot be considered a definitive reference source. It can only be seen as a starting point. It contains a huge amount of information amassed from many sources of varying quality, presented with very little oversight, editing, or attention to that essential quality of this science—detail.

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**Pandora.** Pandora Media, supported by the Music Genome Project. <http://www.pandora.com/> (Accessed February 2009). [Requires a Web browser, an Internet connection of at least 150 kbps, Adobe Flash Player, a sound card and either speakers or headphones. Firefox and Internet Explorer browsers are supported for Microsoft Windows 2000 or later. Firefox and Safari browsers are supported for Mac OS X, version 10.3 or later.]

In a crowded market, Pandora has emerged as one of the largest providers of Internet radio. Powered by the massive Music Genome Project, Pandora facilitates exploration of hundreds of composers, singer-songwriters, and musical artists that cover the spectrum from renowned to very obscure. Users are able to create customized radio stations that become more tailored to their musical tastes based on user feedback and on data provided by the Music Genome Project. Beginning with a single song, or “seed,” Pandora uses a complex algorithm—in tandem with a user’s “thumbs up” or “thumbs down” rating—to match that song’s assigned musical attributes with other songs that share all or some of those attributes. The more feedback a user provides and the more a station is played, the more accurate Pandora is in determining what songs should be played on that station. It should be noted that Pandora identifies each separate track on an album as a “song.” So, for the purposes of this review, Puccini’s “Mi chiamano Mimi” from *La bohème*, the overture to *Oklahoma!*, movement two of Beethoven’s Symphony No. 7, and Weezer’s “O Girlfriend” are all examples of songs. I suspect this is an unavoidable consequence of licensing agreements, as well as the indexing approach associated with the Music Genome Project, both of which will be discussed later in this review. Similarly, Pandora refers to each musical contributor in the Music Genome Project as an “artist.”

The taxonomy born of the Music Genome Project is what sets Pandora apart from other Internet radio stations, such as Last.fm (<http://www.last.fm/>), Slacker (<http://www.slacker.com/>), and Live365 (<http://www.live365.com>), to name a few. Pandora’s co-founder Tim Westergren created the Music Genome Project in 2000. Starting with an initially meager list of variables, Westergren hired a team of analyst-musicians to listen to music and populate a database with descriptions related to a song’s melody, harmony, rhythm, basic instrumentation, and hundreds of other attributes. He describes these elements as “genes” that compose a sort of musical DNA for each song. Certain parts of each DNA string can link to other songs with similar qualities. The Project’s analysts also identified several broad “Genomes” that

Pandora appears to treat as genres. Some examples of these genomes are Rock, Classical, Blues, and Holiday, with subcategories of British Invasion, Choral (Baroque Period), Chicago Blues, and Swingin’ Christmas, respectively. Nolan Gasser, adjunct professor of musicology at Stanford University and chief musicologist for Pandora Media, collaborated with Westergren to better define each genome and expand his list of genes from 400 to over 600 by the time they launched Pandora in 2005. A sampling of these attributes—ranging from “chromatic harmony” and “major key tonality” to “gangsta rap attitude” and “G-funk synth line”—is discussed in Pandora’s FAQ list (<http://blog.pandora.com/faq/>).

Like many traditional, terrestrial radio stations, Pandora is supported by advertisements, and offers its services to users at no charge. A large number of advertisements are specific to Pandora, yet more and more they seem to appear on behalf of commercial sponsors. Ads are primarily visual, but Pandora has recently added short audio advertisements in-between a certain number of songs. A user with a free account can create up to 100 stations. For an annual fee of \$36, Pandora also offers a subscription service in which advertisements are omitted. Subscriptions are available for single users only and include an option to access Pandora using certain brands of home listening devices. A mobile service through which users may access Pandora on cellular phones is also offered, however, this option is currently limited to a small number of providers. Apple, Inc. offers a free application that uses iTunes to run Pandora on one’s iPhone or iPod Touch. Users access the same Pandora account, regardless of the technology being used.

Visually, only about two-thirds of Pandora’s main page consists of functional content, while one-third is taken up by advertisements. Each time a new song is played on a station, as well as whenever a user clicks on virtually any button, the current advertisement refreshes and a new one appears. This distracting and rapid rotation likely occurs because Pandora pays a small amount in licensing fees for every song played, so the site managers are inclined to balance each tiny expenditure with a hopefully less-tiny profit. In addition, Pandora has instituted a timeout—one

hour for free accounts and five hours for paid subscriptions—if a station is playing but the user is not actively participating on the site.

Pandora supplies music to its listeners by means of streaming media, in MP3 format, and at a compression rate of 128 kbps. This rate is adequate for pleasure listening but may not capture certain nuances that can be important for critical or scholarly analysis. As Internet bandwidth and file storage space increases, so will service providers' capabilities to stream higher quality audio than is currently offered. Perhaps such a change will prompt Pandora to offer premium subscription services that deliver audio at a lossless rate.

In March 2007, the U.S. Copyright Office's Copyright Royalty Board increased royalty rates for performance rights by 300 to 1,200 percent. Internet radio providers expressed concern over sustainability of their operations should they be required to meet such rates. In September 2008, after a year of negotiations between Internet radio providers and record labels, Congress passed the Webcaster Settlement Act. While this bill allowed for reduced royalty payments for broadcasters compared to the originally proposed rates, Pandora still had to find ways to increase revenue to support these new expenses. This rate increase was the impetus for adding audio advertisements to free user accounts, which Pandora did grudgingly. (Unlike traditional AM/FM radio stations, Internet radio stations are required to pay royalties for both performance rights and author rights.)

Pandora offers several avenues of support to its listeners. A prominent 'help' link leads users to an extensive and well-organized FAQ list, which also contains a wealth of background information on Pandora and the Music Genome Project. Contact information is available on the site for Pandora's main office and includes a mailing address, telephone number, and several inquiry-specific e-mail addresses.

Over 500,000 analyzed songs (a.k.a. tracks) are included in the Music Genome Project and available through Pandora, with over 15,000 songs added on a monthly basis. Major and independent commercial labels are well-represented due to licensing agreements between Pandora and representative agencies like ASCAP, BMI, and

SoundExchange. In addition, Pandora solicits musical submissions on their site and claims to have a rigorous vetting process. Over 40,000 musical artists are represented in the Music Genome Project, seventy percent of whom are not affiliated with a major record label. Pandora's multi-pronged approach to building a substantial musical system has resulted in a diverse offering of content. However, while contemporary popular music in English is very current and makes up the majority of Pandora's content, there is little world music included. Currently, Pandora claims to offer tens of thousands of "recordings" by over 500 composers from its Classical Music Genome, which was not added to Pandora until late 2007. (It is not clear whether a recording is considered the same as a "song," which would skew Pandora's estimation toward higher numbers.) Pandora contracts with various for-profit entities, in order to provide users with a value-added experience, to direct users to opportunities to purchase music they heard on Pandora, and to take a small cut of any referred sales made on iTunes and Amazon.com. Album art is provided by Amazon, while biographical and discographical information is taken from Allmusic.com, which is affiliated with the All Music Guides monographic series. All biographical entries contain attribution. Information from commercially produced albums includes, when applicable, the "song's" title, composer, and duration, the performing artist, performing group, and the record label and record catalog number. Information for performers is only available if Pandora is able to obtain album art from Amazon.com. The same amount of track information is available, however (title of piece and movement, if the latter applies). If a user clicks on the prompt to "Buy this CD from Amazon" when listening to an unidentified album, he or she is taken to a list of possible albums available through Amazon.com.

It is equally a defining quality and a limitation inherent to Internet radio that a user cannot choose exactly which songs are to be played on any given station. Pandora is aptly named because of this function, in that it provides a Pandora's Box of content. A user may designate a specific artist or song as the seed for a station, and from this minimal information Pandora generates a

playlist. Upon creating my Hans Leo Hassler station, the first song that plays is *Verbum caro factum est*. Sometime later, when the *Credo* from Victoria's *Missa O quam gloriosum* begins playing on the same station, I can ask Pandora why this song was selected (there is a button for this). It responds that the song's features consist of "a Renaissance style, a chorus, major key tonality, modal harmony, and a moderate tempo." The Music Genome Project only appears to assign attributes to music and not to a particular composer, performer, or performing group, aside from the defining characteristics of an individual's or a group's musical output. The fact that a user cannot expect to create a station that reliably plays only music by students of Schoenberg is an unfortunate hindrance. Pandora's role as a discovery mechanism would only be reinforced should the Music Genome Project decide to apply its unique classification system to attributes of musical creators. (Strangely, a user also currently cannot create a station based on a specific musical attribute assigned by the Music Genome Project.)

Pandora does offer an advanced search function for songs and artists. A search on the band Dispatch results in a biographical entry, a selected discography, and recommendations for similar artists. Users are prompted to create a station based on the search results. If a specific song is entered for a seed—say, a symphonic movement—it is likely that various recordings of that movement will eventually be played on that station. While a user cannot narrow a station's scope instantaneously, he or she can increase variety of an existing station by adding another artist, song, or composer. A user can also use Pandora's "QuickMix" function to shuffle all or some of his or her stations.

A user can browse by a very limited list of Genre Stations that represent each Genome. The list is rather well-hidden, as an icon in the Flash information panel below the scrolling display of tracks. Each Genre Station contains one level of subgenres and after a user has "narrowed" his or her choice of subgenre, a station is automatically created. Pandora guides the user through the browsing process by explaining why the first song was chosen. For instance, when I select the Folk Genre

Station, then choose Bluegrass as a subgenre, Flatt & Scruggs' "Old Salty Dog Blues" plays. An integrated and fairly unobtrusive tab appears within the browser that describes "Old Salty Dog Blues" as having "bluegrass instrumentation, country influences, folk influences, mild rhythmic syncopation and acoustic sonority." Another tab with a similar explanation pops up when the next song, Ralph Stanley's "Katy Daley", begins playing. A user cannot browse by or search for an individual musical attribute, leaving the user somewhat to the mercy of Pandora's indexing capabilities and the taxonomy of the Music Genome Project. I say "somewhat" because, as mentioned earlier, the user plays as much of a role as the system in narrowing down his or her desired music. A user may always skip a song and move forward to the next one, and Pandora reads this as a neutral rating. If a user votes "thumbs up" for a particular song, songs exhibiting those qualities will be played frequently on that station and that exact song will be re-entered into the cycle. If a "thumbs down" vote is given, that song will no longer be played on that station, but may appear on other stations. Also, a user may move a song to another existing station or ask that a certain song not be played for a month.

Unfortunately, a user is not able to indicate to Pandora why a certain song got the thumbs down, and this is by far Pandora's greatest shortcoming. Because there are numerous recordings available for a song in certain genomes—with Classical representing one of the obvious situations—a user may like a piece but not a certain performance. Pandora has no method of distinguishing this preference, so all performances of the song will be removed from that station. Perhaps a faceted display function that could allow users to browse assigned musical attributes would help the site achieve higher accuracy. For instance, my Chieftains station plays as many purely instrumental pieces as it does songs for voice and instruments, and I have no direct means of indicating to Pandora my wish to hear only instrumental works. Some licensing restrictions affect Pandora's options for delivering music. A user cannot skip more than six songs per hour on a single station, no rewind or replay button is available on the media player, and only up to four songs

by the same artist may be played within three hours. Multi-movement works could be played in entirety, but not purposefully or sequentially. Licensing agreements also require listeners to have an IP address located in the United States.

A good portion of Pandora's functionalities are dedicated to social networking among listeners, which contributes greatly to its role as a music discovery tool. Every Pandora user has a profile that displays all of his or her stations (including the station to which the user has most recently listened), bookmarked songs and artists, bookmarked users, and a comment box in which other users can leave messages. Users can "friend" each other and track one another's activity on Pandora through the site or through an RSS feed. The ability to purchase music through iTunes and Amazon.com is prominent throughout the site, but it is especially noticeable for songs and artists that have been tagged in a user's profile. The networking power of Pandora is perhaps most prominent when one considers the number of pre-set stations that are available to users. As mentioned before, a user can create a station set by the Music Genome Project using the listed Genre

Stations. Most stations, however, are user-generated and open for sharing among the greater than ten million users of Pandora, two million of who use Pandora on their iPhones.

Consumer studies have suggested that online recommendations, often through social commenting, have at least as much effect on a user's inclination to purchase music as a professional music critic. The Music Genome Project's powerful indexing scheme coupled with Pandora's delivery and sharing options brings respectable elements of detail to an online genre that is not normally considered an academic tool. Some questions remain concerning the authority of the taxonomy and limitations of the existing search mechanism. Internet radio may never be considered a scholarly resource or even used in the classroom, yet the amount of detail brought to Pandora by the Music Genome Project allows for advanced discovery across musical genres. I, for one, am hopeful that such a thoughtful approach will have a positive impact on the music industry and music scholarship alike.

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