

From Reproduction to Performance: Media-Specific Music for Compact Disc

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THE RECORDING AS OBJECT AND PRACTICE

In his *Theory of Musical Reproduction*, Theodor W. Adorno emphasized that for music, listening is not primary: “Sound is a [mere] reflex. . . . The enlightenment of music is its transfer into the inner sense” [1]. It is this conception of music as an inner representation that allows the listener to depart from music’s sonic reality. Where music is not limited to its realization in sound, the sound itself may represent another acoustic emanation, or a whole range of possible acoustic emanations. The idea of identifying a piece of music with a certain and invariable sonic reality arises from the yearning for the fixed and secure. It also corresponds to the way music has mainly been experienced since the 1930s: as recordings played by the listener or broadcast in various media.

Because of the music listener’s ability to experience sounds as a reference to the *intention* of acoustic emanations, the mediality of sound recording and transmission seems to have vanished from the listener’s awareness early on. In the 1930s, when enthusiasts began building large (and expensive) collections of recordings, it was often claimed that “[w]hat one hears on the modern instruments [i.e. gramophones] is actually the performance of the artists themselves” [2], and radio transmissions were considered “almost perfect” [3]. Only a few intellectuals, among them Leopold Stokowski, then director of the Philadelphia Orchestra, drew their attention to the role of the listener’s situation in shaping his or her experience: “You hear on your radio the dial telephone in the next room; you hear the refrigerator; you can hear all the vegetables in the refrigerator talking to each other” [4].

Since the preferred site of the connoisseur’s record playing was the middle-class living room, the gramophone turned, like the piano before, from an instrument into a piece of bourgeois furniture [5]. As Thomas Mann described in his *Doktor Faustus*, one would gather after coffee for “mechanical-musical presentations” and pick and discuss pieces, movements and arias [6]. The private, individual record concert places the music heard in a social discourse. In this way, a practice is established that compensates for the loss of the original performance’s aura [7]: The recording serves as a substitute, as a reminder and not as a final representation of a composition or performance. The record collection turns into a museum, and even Adorno, usually opposed to the petrified object that art is turned into by its technical reproduction, acknowledges that here “[t]he dead art rescues the ephemeral and perishing

art as the only one alive. . . . [This] reestablishes by the very means of reification an age-old, submerged and yet warranted relationship: that between music and *writing*” [8]. It is this understanding of listening to records as a recollection that allowed one of the guests at the evening party described in Thomas Mann’s *Doktor Faustus* to substitute the playing of a record of the ballroom music of Berlioz’s *Symphonie fantastique* with whistling the melody when its recording could not be found [9].

GRAMOPHONE-SPECIFIC MUSIC

From early on, several attempts have been undertaken to establish gramophone-specific music. László Moholy-Nagy’s 1922 suggestion to create “new, not yet existing sounds and tone-relations” by means of cutting synthetic curves into a wax record was probably never realized [10]. The “scratch-handwriting” would have been a method of sound synthesis that turned the gramophone from a medium of reproduction into a medium of production. Early examples of *Grammophonmusik* that were realized include works by Paul Hindemith and Ernst Toch in 1930, which used the gramophone as an instrument to alter specifically prepared recordings, mainly by changing the playback speed [11]. (When John Cage incorporated gramophone records and variable-speed turntables in his *Imaginary Landscape No. 1* [1939], *No. 2* [first version, 1940] and *Credo in Us* [1942], he made use of commercially available test-tone records and classical music recordings.)

More fruitful approaches were concerned with the specific form of the gramophone record itself. They can be found among the many instances in which artists, mostly since the 1960s, discovered the phonograph record as a sculptural object or medium for distribution of sound works [12]. One example is that of “multi-groove” or “multisided” records that provide more than one groove per side. They can be interlocked like the three grooves on *You’re the Guy I Want to Share My Money With* by Laurie Anderson, John Giorno and William S. Burroughs (1981) [13] or establish a large number of concentric loops—as many as 250 per side on *Various 500 Lock-Grooves by 500 Artists* (1998) [14]. Another example is an anonymously distributed 1981 LP record with blank grooves, stored in a

ABSTRACT

When the compact disc was introduced in 1982, it was considered the first recording medium to vanish behind the audio information carried by it. Artists nevertheless discovered media-specific features unique to the CD. This paper focuses not so much on sound production (skipping CDs, glitches, etc.) as on musical form and listener participation in music for CD, which seems to have anticipated certain aspects of iPod culture.

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Fig. 1. Olivier Henry, *no play*, 1996. (Photo © Volker Straebel) As with the LP record before it, visual artists discovered the CD as a sculptural object. Thus, it was not to function in its intended use of audio storage and reproduction. The presentation of Olivier Henry's *no play* refers to the way CDs were displayed in record stores.

cover made of sandpaper [15]. The record will inevitably get scratched, depending on its use. This treatment turns the mechanically reproduced object into a unique item, an inversion, that is only set up by the artist but carried out by the perceiver.

It becomes obvious that the concept of gramophone-specific music is determined as much by the record's use as by its design. Even if we disregard works that use the record as a medium of sound storage in a traditional way and specify how the record is supposed to be played—one might think of John Cage's score *Program (Knobs) for the Listener* (1969), which accompanied the LP recording of his *HP-SCHD* and instructed the listener to alter dynamics, balance and filters while playing the record [16], or Eliane Radigue's set of two identical singles $\Sigma = a = b = a + b$ (1969), to be played at different speeds at the same time [17]—the performative aspect of any gramophone-specific music is hard to deny. For, when not being played, the gramophone record remains utterly silent, even more so as it lacks the possibility of being read and imagined like a score. Here Adorno's comparison of gramophone record and writing [18] seems to fail. The container, rotating on the potter's wheel called the turntable, remains indeed empty and needs to be filled by the listener [19]. It is at the listener's discretion to actually perform this kind of gramophone-specific work and thereby turn the mere playing of a record into a unique performance of the piece.

In the end, no two performances of the ever-changing "sandpaper record" will be the same, and for the listener to the "500 Grooves" record, it will be mere coincidence to find a specific groove again. These experimental artists' records realize structurally the call of American comedian Mort Sahl for a "perfect jazz record" that would produce different solos every time it is played [20].

THE END OF SOUND RECORDING MEDIA

Today, as music is more and more distributed and especially consumed as digital files, and file-sharing systems as well as user devices such as MP3 players or cell phones become interchangeable, the compact disc appears to have been the last sound-recording medium. While digital audio tape (DAT) and mini disc (MD) were limited in spread and life span, the compact disc not only introduced digital sound storage to the consumer market in 1982, but soon became the leading medium, outselling vinyl records in 1988 [21]. As a medium bound to a tangible object—as opposed to a mere technique, such as sampling or on-line radio—the compact disc probably for the last time established a whole culture of the design, use and feel of a recording medium. Irrespective of their technical qualities, at the time of their introduction, aspects like the size and mirroring surface of CDs became the object of discussion: "[W]hen you look down at the side without the

label, the side of the compact disk [sic] where music is, you get a slightly unpleasant surprise: the image of your own face staring back from the mirrorlike surface" [22]; "they are very pretty to hold and behold: gold with rainbow reflections, nestling neatly in a small plastic box" [23].

Early technical reviews, on the other hand, enthused that it would be "easier to cite the sonic problems the Compact Discs did *not* have": rumble, flutter, distortion in loud passages, pre- or post-echoes, etc. [24]. If there was an unequivocal, solely audible characteristic of the CD, it was its lack thereof. Digital storage and algorithmic error correction turned ground noise and distortion, which until then had inevitably accompanied every sound recording or broadcast, into silence. Therefore, the mediality of sound recording is likely to vanish from the listener's awareness for a second time. Because of the medium's improved quality, we hear the sound no longer as a reference to a known or imagined sound but as the sound itself. The qualities that might allow us to unmask the sound as recorded are more subtle in nature: the difference between recording space and playback space, and aspects of dynamics, timbre and the like.

Interestingly enough, in the realm of digital sound recording, Thomas G. Stockham, Jr., one of its pioneering engineers, introduced once more the metaphor of writing. In this case, analog recording is compared with oral history, in that the transfer of a recording is not just a copy but, because of its added distortion, turns into another "story." Compact discs, on the other hand, are said to be "not just better sounding recordings; they are documents. For the first time, man is able to *write* sound. . . . What the consumer gets is not a copy. It's the original" [25]. For Stockham, who considered "digital recording as a new medium, not just a new technology" [26], the concept of writing is applied to the process of coding, decoding and data storage. That is opposed to Adorno's reference to writing in connection with sound recording, where the reification of the fixed and reproduced art in a dialectical turn "rescues the ephemeral and perishing art as the only one alive" [27].

MUSIC FOR COMPACT DISC

It might be due to the fact that this difference between the "writing of sound" and the "reproduction of the work of art" became manifest in the new medium of the compact disc right after its introduction that artists began to create work spe-

cific to the new medium. Yasunao Tone began experimenting with prepared CDs in 1984 and premiered his *Music for Two CD Players* in 1986 [28]. In 1988, Nicolas Collins started incorporating hacked CD players in his live-electronic works, which allowed, among other features, hearing the “hidden,” not intentionally audible control data of the CDs [29]. Both composers laid the foundation for the now-ubiquitous aesthetics of skipping and glitching sounds in electronic and laptop music.

While the compact disc as a means of sound production and a device in live electronic music has been widely discussed [30], rather little attention has been drawn to media-specific music for CD, where the compact disc is understood as a material object for the end user’s appreciation. For such work, the artist utilizes certain qualities of the CD that are unique to this medium, and usually the listener is assigned the role of a performer, as the listener does not just play a recording but interacts with the medium. The works discussed here relate to different aspects of media-specific music for CD: The CD as a physical object and the CD as a medium of open form. In this article, only a selection of works will be discussed; many more can be found [31].

THE CD AS MEDIUM AND OBJECT

As with the gramophone record before it, artists have discovered the CD as a sculptural object to be altered, decorated or damaged without regard to its actual functionality. The French artist Olivier Henry removed by hand the thin data-carrying aluminum layer and silk print of CDs with rough scrapes and combined the damaged object with printed cardboard in a transparent plastic bag, as if intended for display in record stores (Fig. 1). In the one such piece in my collection [32], only the area around the logo “Compact Disc Digital Audio” and the line “Fabriqué en France,” both printed silver on bright pink, remain intact. The cardboard carries the inscription: “Been filed for years under: EASY LISTENING...Until the day...– no play –” [33].

What music had been stored on this CD we do not know. The artist turned the mass-produced sound carrier into a unique piece of art by aggressively ripping off its audio data, and, by making it useless for its intended purpose, revealed the CD’s material aspects: its shape and the substances it is made of. It also ap-

Nick Didkovsky: 44 Nerve Events (excerpt)

The musicians mentioned here are:
 Greg Anderson—electric bass
 Leo Ciesa—drums
 Nick Didkovsky—electric guitar
 Michael Lytle—bass clarinet
 Yves Duboin—soprano saxophone
 Marc Wagnon—vibraphone
 Dave Douglas—trumpet

Nerve Event # 1
 4 seconds
 LYTLE, DUBOIN: 2 loud sforzandos each, any pitch

Nerve Event # 2
 2 seconds
 WAGNON: 4 quiet muted pitches
 DIDKOVSKY: 4 quiet pitch/harmonic combinations

Nerve Event # 3
 4 seconds
 ANDERSON: one quiet 4-note chord
 CIESA: Loud low-tom flam on BEGINNING and END

Nerve Event # 4
 FULL BAND: non-pitched non-rhythmic rapidly changing dynamic noise.
 Stop when you notice someone stopped.

Nerve Event # 5
 6 seconds
 DOUGLAS, LYTLE: Slow quiet trill, any interval any pitches
 DUBOIN, WAGNON: One loud squawk or bleat each

Nerve Event # 6
 4 seconds
 CIESA: Rapidly changing dynamic 32nd notes on high tom
 WAGNON, DIDKOVSKY, ANDERSON: One gliss up or down

Nerve Event # 7
 4 seconds or so
 DUBOIN, DIDKOVSKY: Staggered pops. Avoid coincidence. Stop as soon as your pops coincide.

Fig. 2. Nick Didkovsky, *44 Nerve Events*, verbal score, excerpt, 1990. (© Nick Didkovsky). The musicians of Doctor Nerve followed Nick Didkovsky’s instructions when performing the *44 Nerve Events* in the recording studio. Printed here for the first time, the verbal score reveals the relation of composition and improvisation at work. The “Nerve Events” from number 26 on were free improvisations.

pears vulnerable. Its presentation as an anonymous object in the context of its originally intended commercial distribution emphasizes the contrast between the unique and the industrially produced, as well as between the CD as physical object and as medium.

A less obvious, but, in its inconspicuous approach, surprising CD object is *[R•] iso|chall* (2000) [34], which contains remixes of different tracks of the CD *IT ISO161975* by Florian Hecker (1998) [35]. The CD carries no label, and the two sides of the item look almost the same. Only in the transparent inner ring of the CD can the label number “Mego 024” and the logo “Compact Disc Digital Audio” be made out. When the

CD is inserted into the player and “Play” is pressed, the audio system remains silent. The only sound heard is the noise of the CD player’s mechanics in their failed attempt to position the optical pick-up at a point where data can be deciphered—but there is none. Depending on the model of CD player used, the soft rubbing and clicking sounds continue until “Stop” is pressed or the pick-up unit gives up after a certain number of failed attempts. When the CD is turned over and inserted into the player upside down, it is read correctly and the first track can be heard: Bruce Gilbert’s *midi slide guitar mix*, the glitch and skip sounds of which remind one of the mechanical error noises experienced before. Hence,



Fig. 3. Freundschaft, *Shuffle. Music for Compact Disc*, 1993. (Photo © Volker Straebel) The packaging of *Shuffle* reflects the structure of the music: Just as the tracks may be played in any order, the 10 double-sided leaflets of printed text can be freely arranged.

[R•] *iso|chall* not only makes the listener aware of the implications of the CD as an object, it also introduces the CD player as an instrument, capable of mechanically producing sounds.

THE CD AS A MEDIUM OF OPEN FORM

When the compact disc system was introduced in 1982, the first players offered only rather limited features for navigation or programming. While the Sony CDP-101 allowed fast and slow backward and forward scanning within a given track, the Hitachi DA-1000 was capable of programming a playing sequence [36]. Both features were combined in the CD 100 by Philips, with the number of tracks that could be handled limited to 15 [37]. Soon these playback features were further improved.

That it took experimental artists more than half a decade to create CDs that explicitly encourage the listener to change the original order of the tracks while playing them—Nicolas Collins’s *100 of the World’s Most Beautiful Melodies* of 1988–1989 is usually considered the first example of this approach [38]—might

be due to the limited access to production resources and the high prices of CD manufacturing in the beginning. During the first half of the 1990s, several CDs were issued that made use of the medium’s characteristics in terms of open form, that is, the performer’s freedom to change the order, repeat and/or omit certain sections.

The Need to Program

44 Nerve Events for you to program in inventive sequences by Nick Didkovsky (1990) [39] features short musical gestures performed by Didkovsky’s downtown New York group Doctor Nerve (Fig. 2). They are presented as tracks 17 to 60 on a CD that otherwise holds 16 pieces by the same octet that are not related to that work. The subtitle, as well as the liner notes, ask the listener to bring the Nerve Events into a different order by programming the CD player: “Finally there is the listener as active composer. That’s what the *44 Nerve Events* are for. Torture your CD player with them” [40]. To overcome the composer’s control as expressed in a fixed score was Didkovsky’s intention in some of the other works on that CD, which make use of algorithmic real-

time score synthesis. To overcome the composer’s control by encouraging the listener to compose the order of short musical phrases by him- or herself appears as a similar concept only at first sight. The listener is free in these decisions, while the algorithm follows compositional rules. That the listener might pass back that freedom to the machine by using the shuffle mode for playback is prevented by the fact that the CD carries other tracks not related to the Nerve Events [41].

The Freedom to Shuffle

Other works for CD specifically refer to the CD player’s shuffle mode as the requested method of performance. In the liner notes to *100 of the World’s Most Beautiful Melodies*, a collection of short, very concentrated, improvised duos featuring a large selection of musicians, Collins writes, “the listener now has the option of involving him or herself in a further level of performance, by using the random access capabilities of the CD player to rearrange the 42 cuts” [42]. While the composer does not mention the option of shuffle play here, in a later interview he explains, “it is wonderful to put the

CD on a ‘random play’ mode, because it is quite unexpected, like playing roulette” [43]. Just 4 months after the CD’s production, Collins mused about “how to use the CD as a performance tool” [44]—in his own performances as well as those by others, where ultimately shuffle play would be only one of many options to “perform” the CD’s recordings. Otomo Yoshihide later emphasized this notion when he interpreted his CD *The Night Before the Death of the Sampling Virus* (1993) as an “application” of 77 viruses (tracks), to be played in shuffle or repeat mode or fast-forwarding [45].

Shuffle. Music for Compact Disc, by the German noise/industrial group *Freundschaft* (friendship), recorded in 1992/1993 (Fig. 3), is “meant to be played in shuffle-mode of a compact-disc player. . . . To reveal the full power of this recording, play it shuffle!” [46]. The CD is presented in a square-shaped cardboard box, which also contains 10 square cards with liner notes, track information and literary texts printed on both sides. The cards are numbered but can be arranged in any order, even upside down, or turned by 90°. As a result, the package reflects the structure of the music, which remains rather abstract with its 99 tracks randomly played by the machine. When played in the original sequence, the short sections—musical quotations and left-wing intellectual political readings—follow each other with no interruption. Therefore, one might speculate about the appropriate “instru-

ment” for the *Shuffle* CD to be performed on. On a regular CD player, the time the optical pick-up unit needs to travel from one track to another determines the duration of the silence between tracks. If the player buffers the audio data before transmitting it to the output, the time between tracks can be bridged in shuffle mode as well. Since portable CD players with an electronic shock protection system (ESP) had been available since 1992 [47], it is quite possible that *Shuffle. Music for Compact Disc* was intended to be performed on such a device.

For other works, employment of an ESP-equipped CD player seems inadequate. Chris Mann’s *Chris Mann & the Impediments* (1995) [48], for example, carries standard 2-second silences between the tracks. Presented in a clear jewel case, the CD comes with no further information than is provided on its label, which reads: “36:39 80 tracks for shuffle play < 10:00”. Stored on the CD is the reading and improvised singing of one of Mann’s typical breathless, involved, philosophical yet sound-poetic texts, executed by the author, Carolyn Connors and Jeannie Marsh, together with electronic sounds by Rik Rue.

Mann explains: “3 voices with mics and headphones arranged so that voice A can hear voice B in the left ear, voice C in the right, with the volume turned up so she can’t hear herself. Same for B and C. Rik is a wild card with independent and individual access to all/any headphone mix. That is the score. It’s the only piece

I’ve done specifically for CD, though I’ve long been interested in performers as biological signal processors” [49]. While the text looks like one long paragraph, Chris Mann claims it is in 78 paragraphs, which corresponds to the number of tracks, plus two for the title lines: “The very idea:” and “Absence, the alibi of context,” (sic) [50]. That the tracks are separated by silences establishes a clear structure and secures coherence within each paragraph or section. The acoustic or musical separation of the sections would be diminished if not lost if an ESP-equipped CD player produced the requested shuffle play.

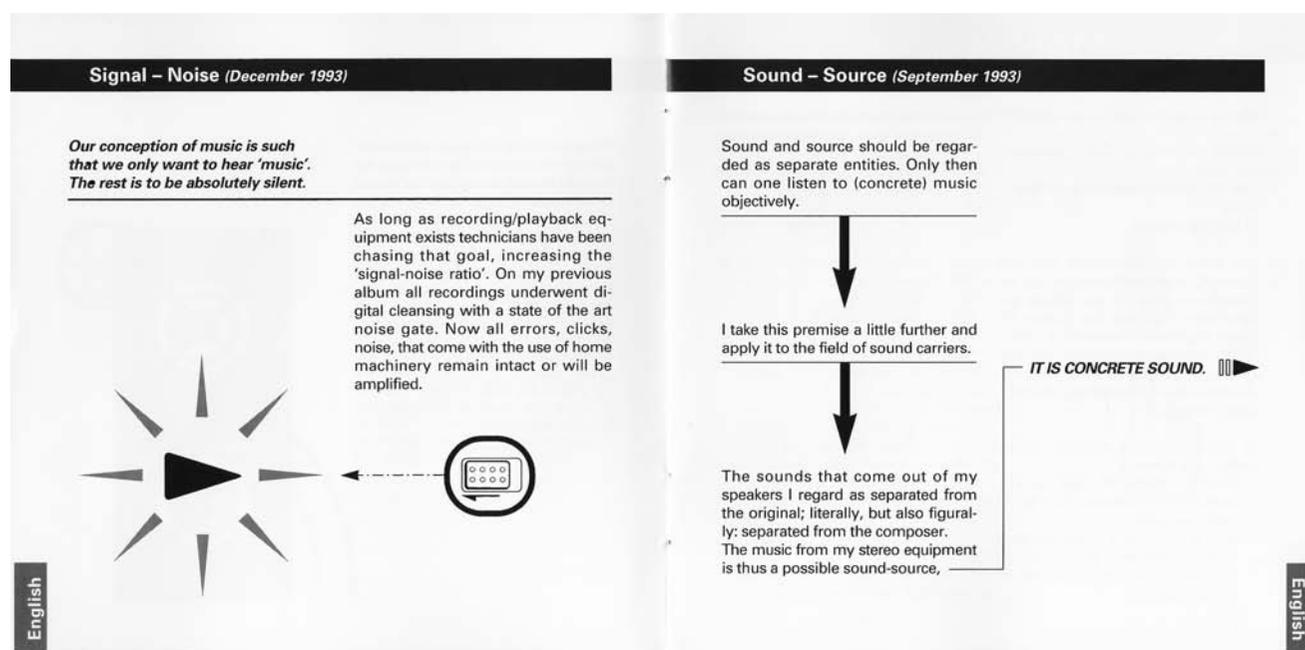
FROM REPRODUCTION TO PERFORMANCE

In media-specific work for CD, when the ephemeral aspect of music is recovered from the petrified reproduction, and listening to a recording cannot be distinguished from performing a recording, the relation of work, score, instrument, performer and performance needs to be specified anew. Ios Smolders faced this question in his *Music for CD-Player* (1994), which is released with a booklet designed like a user manual (Fig. 4). There he states:

The CD contains a digitally encoded score. Your CD Player is the performer. You are the conductor.

The playing of this CD, just like any live performance of a classical work[,] is a unique event. Each time you play this

Fig. 4. Ios Smolder, *Music for CD-Player*, 1994. (CD booklet design © Angus R. Shamal) The booklet of Smolder’s *Music for CD-Player* got the distinct look of a user manual of a technical device. Thus, even the artist’s more general aesthetic statements gain the binding character of proceedings in audio engineering.



CD you start a performance. In order to give you and the performer maximum flexibility[,] the work has been divided into as many parts as is technically possible [i.e. 99 tracks].

There are several ways of performing the score:

1. Take a distance and just have the performer [i.e. the CD player] work itself through the score from beginning to end.

2. Decide what parts of the score are to be played, either by programming or remote control.

3. Let the performer improvise, by pushing shuffle or random mode.

4. Adapt the score by physical treatment of the CD [51].

One might add that the CD player here appears to be not only the performer but the instrument as well. The tracks are not separated by silences as a rule, and if they are, the silences occur just like the silences within the tracks—which every now and then are of considerable duration. Thus the time it takes for the optical pick-up to travel to another position, if programmed to do so, becomes an important element of the score's interpretation, which is not so much the performer's decision as it is determined by the instrument's characteristics.

With remarkable consistency, Smolders reads the ordinary playing of the CD from beginning to end as one of the four possible ways in which the CD (the "score") can be performed. Not placing the sections of the music in a different order is, aesthetically speaking, just as good as doing so. Another CD production may emphasize this idea: The 2-CD sampler *A Chance Operation: The John Cage Tribute* (1993) contains contributions by various artists that carry extra track marks in the course of the pieces. These extra marks remain unnoticed as long as the CDs are played continuously from beginning to end, but can be used to split up the individual works into a global shuffle mix [52]. Again, the decision not to change the track order is as much a decision as to do so.

Moreover, for Smolders, open form and user (i.e. listener) interaction in his *Music for CD-Player* serve as means to address implications of sound recording per se. Media inevitably alter their content and influence the way in which content is received: "The 'consumers' of music regard the music that comes out of the stereo equipment as the actual thing. They are not aware of, or ignore the fact that what they hear is a deformed, bent, filtered, scrambled, resampled version of the original thing" [53]. When the listener is encouraged to decide about the

playlist, argues Smolders, that listener might question other aspects of the recording medium as well: sound quality, dynamic range, factors related to the listening situation and so on.

ANTICIPATION OF THE IPOD METAPHOR

Today, with physical recording media vanished and iPod and iTunes omnipresent, the concept of sound recording and distribution has finally shifted from sound carrier to sound file management, that is, from object to technology. iTunes users no longer associate their music collection with a bulky library of LPs or CDs but with files and folders on their hard drives, memory cards or mobile devices. While—mainly in the realm of popular music—the notion of the album has disappeared, a new concept has been established that enables listeners to select from their collection according to their mood or activity: the playlist [54]. "Smart Playlists" can be automatically derived from the music file's ID3 tags (which include, among other items, artist, year of recording, genre and beats per minute) or play count to match any given criteria. Playlists also can be built manually, shared and joined [55].

In the context of this article, it appears that certain works of music for CD have anticipated the iPod metaphor, wherein navigation becomes an aspect essential to the medium once the file collection to be dealt with has reached a considerable size. Whereas with CDs, artists are free to create the audio material stored on the sound carrier and depend on the features of the playback device, for the iPod they might design code for generating playlists, but those lists will play files the authors cannot anticipate. This situation is reminiscent of Mark Kolmar's web-based *Chaotic Entertainment* (1996) [56], where the fragmented playback of any audio CD inserted into a local computer's CD drive was controlled by means of code that navigated the optical pick-up unit.

Here again, a CD-related audio work from the mid-1990s seems to anticipate a practice common to iTunes audiences: iPod zapping. Listeners tend to transfer their habits of use of the TV set's remote control to their iPod devices and merely sample audio files rather than listen to entire tracks. Douglas Adams suggested automatically "play[ing] snippets of each track in a playlist" and developed code with which the duration and entrance point of audio excerpts can be controlled [57]. That the structure of a remix and

not its content becomes the object of organization is specific to a medium that is defined rather by its random access architecture than by its physical emanation.

CONCLUSION

Looking back, it seems that just at the time when the CD recording medium was established, which later proved to have been the last recording medium as a tangible object, musicians and composers focused on the artistic investigation of media-specific aspects of their CD releases. The recording artist not only turned into a CD designer, taking into consideration all aspects of the physical appearance of the CD release [58], but discovered CD playing and appreciation as a realm of artistic direction. In this way, the notion of reproduction vanished, while the playing of recordings was discovered as a performative activity. With digital recording, according to Thomas G. Stockham, not only did the sound carrier evolve from being a copy to being an original [59], but the situation of listening also became a unique act. Thus, music as an "ephemeral and perishing art" is rescued again (per Adorno) [60], this time not in a dialectical detour but in an ephemeral and perishing situation, which delivers the sound carrier from its role in reproduction to grant it status as a tool of performance.

References and Notes

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2. Garry Joel August, "In Defense of Canned Music," *Musical Quarterly* 17, No. 1, 138–149 (1931) p. 143.
3. H.R. Rivers-Moore, "Musical Reproduction, Gramophone and Broadcast," *Music and Letters* 10, No. 3, 304–306 (1929) p. 306.
4. Leopold Stokowski, "Sound Recording From the Musician's Point of View," *Journal of the Society of Motion Picture Engineers* 18, No. 2, 164–171 (1932) p. 165.
5. See Theodor W. Adorno, "Nadelkurven" [1927/1965], in T. Adorno, *Musikalische Schriften VI*, Rolf Tiedemann and Gretel Adorno et al. eds., *Gesammelte Schriften* 19, 525–529 (Frankfurt am Main: Suhrkamp, 1984) p. 527.
6. "mechanisch-musikalische Darbietungen," Thomas Mann, *Doktor Faustus* [1947], Ruprecht Wimmer and Stephan Stachorski, eds. (Frankfurt am Main: Suhrkamp, 2007) p. 597 (chapter XXXVIII). This account, as well as the famous chapter *Fülle des Wohllauts* from his *Zauberberg* (*The Magic Mountain*, 1924), is based on Mann's own experiences and habits. See Klaus Kropfinger, "Thomas Manns Musik-Kenntnisse," *Thomas Mann Jahrbuch* 8, 241–279 (1995); Charles E. Passage, "Hans Castorp's

- Musical Incantations," *Germanic Review* 38, No. 3, 238–256 (1963).
7. For a detailed discussion of Walter Benjamin's concept of "aura" as established in *The Work of Art in the Age of Mechanical Reproduction* in relation to music recording, see: Rajeev S. Patke, "Benjamin on Art and Reproducibility: The Case of Music," in: *Walter Benjamin and Art*, Andrew E. Benjamin, ed., 185–208 (London: Continuum, 2006).
8. Theodor W. Adorno, "The Form of the Phonograph Record" [Die Form der Schallplatte, 1934], Thomas Y. Levin, trans., *October* No. 55, 56–61 (1990) p. 59, original emphasis. "Die tote rettet die 'flüchtige' und vergehende Kunst als allein lebendige.... [Dies] stellt, gerade durch Verdinglichung, ein uraltes, entsunkenes und doch verbürgtes Verhältnis wieder her: das von Musik und Schrift." Theodor W. Adorno, "Die Form der Schallplatte" [1934], in: Adorno, *Musikalische Schriften VI*, Rolf Tiedemann and Gretel Adorno et al., eds., *Gesammelte Schriften* 19, 530–534 (Frankfurt am Main: Suhrkamp, 1984) p. 532.
9. See Mann [6] (chapter XXXVIII) p. 597.
10. László Moholy-Nagy, "Produktion—Reproduktion," *De Stijl* 5, No. 7, 98–100 (1922) p. 98. The idea to use the gramophone as a means of sound synthesis had been established before but was not accepted in artistic circles: Alexander Dillmann, "Das Grammophon," *Die Stimme seines Herrn* 1, No. 5, 10–11 (1910) p. 11, reprinted and translated in Mark Katz, *Capturing Sound. How Technology Has Changed Music* (Berkeley, CA: Univ. of California Press, 2004) pp. 104, 220.
11. See Martin Elste, "Hindemiths Versuche 'grammophonplatteneigener Stücke' im Kontext einer Ideengeschichte der Mechanischen Musik im 20. Jahrhundert," *Hindemith-Jahrbuch—Annales Hindemith* 25, 195–221 (1996); Katz [10] pp. 99–113.
12. See *The Record as Artwork: From Futurism to Conceptual Art* (Chicago: Museum of Contemporary Art, 1977); Ursula Block and Michael Glasmeier, eds., *Broken Music. Artists' Recordworks* (Berlin: Berliner Künstlerprogramm des DAAD and gelbe MUSIK, 1989).
13. Laurie Anderson, John Giorno and William S. Burroughs, *You're the Guy I Want To Share My Money With*, LP (New York: Giorno Poetry Systems Records GPS 020-GPS 021, 1981). Only the fourth face of the double album is multisided.
14. Various artists, *Various 500 Lock-Grooves by 500 Artists*, LP (Lowell, MA: RRRRecords RRR-500, 1998).
15. Block and Glasmeier [12] p. 86.
16. John Cage and Lejaren Hiller, *HPSCHD*, in: John Cage, *HPSCHD / Ben Johnston*, String quartet no. 2, LP (New York: Nonesuch H-71224, [1969]).
17. "Les faces A et B de ce disque peuvent se combiner entre elles à l'infini à n'importe quelle vitesse 78, 45, 33 ou 16 tours." Eliane Radigue, $\Sigma = a + b = a + b$ [1969], 2 singles (Sacramento, CA: Povertech Industries PSP001, 2000). See also Radigue's article in this issue of LMJ.
18. Adorno [8].
19. "Der Plattenteller von Sprechmaschinen ist der Töpferscheibe zu vergleichen: Ton-Masse wird darauf geformt, der[en] Stoff vorgegeben ist. Aber das fertige Tongefäß, das so entsteht, bleibt leer. Der Hörer erst erfüllt es." Adorno [5] p. 529.
20. This concept has been mentioned by James Goodfriend in a conference discussion: H. Wiley Hitchcock, ed., *The Phonograph and Our Musical Live. Proceedings of a Centennial Conference, New York 1977, I.S.A.M. Monographs 14* (New York: Institute for Studies in American Music, Brooklyn College of the City Univ. of New York, 1980) p. 34.
21. George M. Plasketes, "Romancing the Record: The Vinyl De-Evolution and Subcultural Evolution," *Journal of Popular Culture* 26, No. 1, 109–122 (1992) p. 110.
22. David Denby, "My problem with perfection: The consequences of the CD revolution," *The New Yorker* 72, No. 24/25, 64–83 (26 August 1996) p. 75.
23. John Rockwell, "Listening at Home to the New Compact Discs," *New York Times*, 1983/04/24, H23.
24. David Ranada, "Digital Debut: First Impressions of the Compact Disc System," *Stereo Review*, No. 48, 61–70 (1982) p. 62, original emphasis.
25. Thomas G. Stockham Jr. quoted in Allan Kozinn, "The Future is Digital," *New York Times*, 1980/04/13, SM56, original emphasis.
26. Thomas G. Stockham, Jr., "The Promise of Digital Audio," *Digital Audio: Collected Papers from the AES Premiere Conference. Rye, New York, June 3–6, 1982*, Barry Blesser, Bart Locanthi and Thomas G. Stockham, Jr., eds. (New York: Audio Engineering Society, 1983) p. 12.
27. Adorno [8] p. 59.
28. See Yasunao Tone and Christian Marclay, "[Interview]," *Music* No. 1, 38–46 (1997) p. 43; Yasunao Tone, "Solo for Wounded CD [liner notes]," in *Yasunao Tone—Solo for Wounded CD* (New York: Tzadik CD TZ7212, 1997).
29. See Caleb Stuart, "Damaged Sound: Glitching and Skipping Compact Discs in the Audio of Yasunao Tone, Nicolas Collins and Oval," *Leonardo Music Journal* 13 (2003) pp. 49–50.
30. For a survey, see e.g. Kim Cascone, "The Aesthetics of Failure: 'Post-Digital' Tendencies in Contemporary Computer Music," *Computer Music Journal* 24, No. 4, 12–18 (2000); Stuart [29]; Eliot Bates, "Glitches, bugs, and hisses: The degeneration of musical recordings and the contemporary musical work," in *Bad Music: The Music We Love to Hate*, Christopher J. Washburne and Maiken Derno, eds. (New York: Routledge, 2004) pp. 275–293.
31. The author is indebted to many composers, musicians and enthusiasts who shared their thoughts on the matter of media-specific music for CD on the silence e-mail list in May 1996. The field of works for enhanced CD, CD-ROM and the like is not considered here (see Kristine H. Burns, "An Emerging Digital Community: The CD-ROM Artists," *Organised Sound* 2, No. 1, 13–18 (1997)).
32. The work is not titled, not dated and not signed. It was sent by the artist to the author in June 1996. No further indication is given in the accompanying letter.
33. The line "EASY LISTENING" is printed seven times, followed by ".../..."
34. Various artists, *[R•] iso|chall* (Vienna: Mego, MEGO 024, 2000), CD.
35. [Florian] Hecker, *IT ISO 161975* (Vienna: Mego, MEGO 014, 1998), CD.
36. See Ranada [24] p. 66.
37. See Hans H. Hiebel et al., *Große Medienchronik* (Munich: Fink, 1999) p. 763.
38. Nicolas Collins, *100 of the World's Most Beautiful Melodies*, CD (New York: Trace Elements Records TE-1018CD, 1989).
39. On Doctor Nerve, *Beta 14 ok* [1990] (Silver Springs, MD: Cuneiform Records Rune 26, 1991), CD.
40. Nick Didkovsky, "[liner notes]" [1990], in *Doctor Nerve—Beta 14 ok* (Silver Springs, Maryland: Cuneiform Records Rune 26, 1991).
41. Similarly, *CCM Flotsam* by John Bischoff, Chris Brown, Tom Erbe and Maggi Payne (1994) consists of 15 short tracks to be played in any order and is stored on a CD that contains five more works ([Various artists], *CCDM Computer Music Series Vol. 17, Music from the Center for Contemporary Music [CCM] at Mills College*, CD [Baton Rouge, LA: Centaur Records CRC 2195, 1994]); see Luc Corvet, "Music from the Center for Contemporary Music at Mills College by John Bischoff, Chris Brown, Tom Erbe, Maggi Payne, Alvin Curran [Review]," *Computer Music Journal* 20, No. 2, 128–129 (1996).
42. Collins [38].
43. Nicolas Collins and Guy de Bièvre, "The Improvisation Moderator. Interview with Nicolas Collins by Guy De Bièvre" [Oct. 15, 1989], *Musicworks*, No. 49, 28–36 (1991) p. 36.
44. Collins and de Bièvre [43] p. 35.
45. Otomo Yoshihide, *The Night Before the Death of the Sampling Virus* (Melbourne, Australia: Extreme XCD 024 CD, 1993), liner notes.
46. Freundschaft, *Shuffle. Music for Compact Disc*, CD (Frankfurt am Main: Frog Records LC3606, 1994) (signed and numbered edition of 345), liner notes, p. 1.
47. Sony D-515, See Hiebel et al. [37] p. 775.
48. Chris Mann, *Chris Mann & the Impediments*, CD (Black Rock, Connecticut: 0.0. Discs, 1995).
49. Chris Mann, e-mail to the author, 2 June 1996.
50. Mann [49].
51. Ios Smolders, *Music for CD-Player* [1994], CD (Amsterdam: Staaltape ST CD 077, [1995]), liner notes.
52. Various Artists, *A Chance Operation. The John Cage Tribute*, 2 CDs (Westbury, NY: Koch International Classics 3-7238-2 Y6x2, 1993); see Larry Austin and Rodney Waschka II, "Computer Music for Compact Disc: Composition, Production, Audience," *Computer Music Journal* 20, No. 2, 17–27 (1996) p. 24.
53. Ios Smolders: "High end—low end" (Sept. 1993), in Smolders, *Music for CD-Player*, liner notes [51].
54. For choosing music on the iPod as mood reinforcement see Michael Bull, *Sound Moves: iPod Culture and Urban Experience* (London and New York: Routledge, 2007) pp. 127–133.
55. See Hadley Stern, *iPod and iTunes Hacks. Tips and Tools for Ripping, Mixing and Burning* (Sebastopol, CA: O'Reilly Media, 2004) pp. 241–248, 347–353.
56. The web site <www.xnet.com/~mkolmar> is no longer active, but available from <www.archive.org>. For an analytical review see Volker Straebel, "Chaotic entertainment": Mark Kolmars CD-Remix im Internet," *Positionen* No. 31, 31–33 (May 1997).
57. Hadley Stern [55] pp. 372–373.
58. See Emmanuelle Loubet, "Laptop Performers, Compact Disc Designers, and No-Beat Techno Artists in Japan: Music from Nowhere," *Computer Music Journal* 24, No. 4, 19–32 (2000).
59. See Stockham [25].
60. See Adorno [8] p. 59.

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