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From Torrent to Stream

Economies of Digital Music

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From Torrent to Stream

Economies of Digital Music

Martin Scherzinger

All that Is Music Evaporates in Clouds¹

- ¹ The convergence of wireless technology and the Internet in the first decade of the twenty-first century has given rise to integrated and powerful new portable microcomputers that are being disseminated on a broad scale. The mass adoption of mobile communication devices reflects a growth rate unprecedented in the history of technologies—from a few hundred million to over four billion people in the first decade of the 21st century.² This development affords users the world over with enhanced means for social, economic and political interaction; proffering, on the one hand, new modalities of individuality and autonomy and, on the other, of interactivity, collaboration, and connectivity. As mobile-broadband services bypass those of fixed-line grids, web-enabled phones (“smart phones”) are increasingly used not only to communicate by voice but also to text messages, share information, post updates, transmit image, video, and sound files, specify geographical locations, connect to the Internet, play games, and interact on social networking sites. This extension into data applications, multimedia, and entertainment has transformed the character of the portable phone and fashioned new material relations between and across cultural, symbolic, social-interactive, political, and economic domains. In short, these powerful handheld computing tools have extended communication capabilities and convenience, thereby articulating new socialities in the context of changing economic realities.³
- ² This article reflects on the meteoric rise of mobile smart-phone usage across the globe in the twenty-first-century and the way these devices are increasingly tethered to remote databases (popularly known as “the cloud” or “computing in the clouds”). “The cloud” refers to an immense online computing resource, controlled by mostly private proprietors such as Google, Microsoft, Apple, and Amazon, as well as agencies of government. The article will investigate the implications of these sites, whose geo-

location is largely unknown by the public, for the social, cultural, and above all the financial economies of music. The mobile phone is rapidly becoming the most important technology today for facilitating the distribution of music in the context of potentially ubiquitous digital networking capabilities. While much music today is still stored and stockpiled as content—an album on a compact disc (or, less prevalently, but resiliently, on a vinyl long-playing record), a playlist or a podcast on a hard-drive or a portable digital music device—the global ubiquity of the portable internet-enabled devices marked a shift toward prevalently service-based distribution models for music.

- 3 Viewpoints are divided about the effects new modalities of digital connectivity (the ubiquitous practice of downloading, file sharing, and particularly streaming from music services) have on patterns of musical production today. For many commentators, internet technologies have ushered in the possibility for economic disintermediation, whereby traditional distribution channels (or intermediaries) have been bypassed, allowing musicians to engage their listeners more directly and diversely. The article assesses the reactionary and the progressive promise of disintermediation in relation to new formations of labor, characterized by increased entrepreneurial reliance on flexible and globalized networks of production and distribution. Premised on the idea that digitally mounted creative content be furnished without charge, musical production illuminates a kind of prescient vertex for the re-structuring of labor practices sustaining the material foundation of capitalism today. While, on the one hand, new technological media proffer enhanced user-generated digital applications (for better or worse, culturally speaking), on the other hand, they simultaneously bear witness to a gradual process of labor degradation. The semi-automated production cycles facilitated by new media simultaneously reflect increasing dependence by capitalist cycles of accumulation on a kind of “post-workerist” immaterial labor—forms of flexible, part-time work and entrepreneurial individualism.⁴ This article maps the way mobile music is understood in relation to its perceived cultural curse and promise, before outlining how musical production today readily succumbs to the ideology of initiative and individualism undergirding “self-employment” in the context of new technological efficiencies in delivery and experience.
- 4 As high-speed mobile devices (Apple’s iPhone, Google’s Android, etc.) became widespread, users discontinued the process of syncing and transferring musical tracks from a variety of sources in favor of streaming music from a central server. Cloud-based services thereby render hard drives obsolete, effectively delivering streamlined databanks of musical content to multiple devices, now immunized from the inconveniences of hard drive malfunctions and downloads. In short, the practices of downloading (via torrents and other means) have withered and licensed music access services have become dominant. Spotify, for example, a European-based online music service launched in the United States in partnership with Facebook in 2011, offers unlimited access to its online music library for a small monthly fee based on a “freemium” model, with one advertising-based “free” service and another advertising-free premium model. In a gesture that recapitulates the technological upheavals in the music industry of the past (such as the replacement of vinyl LPs with digital CDs in the early 1980s), early incarnations of the website encouraged users to devalue their current playlists in favor of the service: “Think of Spotify as your new music collection. Your library. Only this time your collection is vast: 8 million tracks and counting.” Here Spotify emphasizes the efficiency of avoiding downloads and the convenience of preserving hard drive memory, no less than its

portability and interactive social functionality; its playlist is “free to share.” Spotify exemplifies the shift toward abstracting and virtualizing users’ music collections, which have shifted over the last decades from the bookshelf to the CD holder, then from the computer to the external drive, and finally to the remote server. In this way, users access vast, and highly organized, playlists using their always-connected computers and ever-relocating smartphones.

- 5 The first decade of the 21st century was characterized by services such as Apple’s iTunes, an application for playing and organizing video and music files on digital media players. This kind of application was still based on a purchase-and-download model (which in turn delivers revenues to music rights holders). However, Apple’s 2009 purchase of Lala (a social network service featuring a web-based music catalog) and subsequent closure of the service (in May 2010) signaled Apple’s move toward a cloud-based musical service, aptly named “iCloud” (in October 2011). In the context of Spotify’s emergence, Apple launched its music streaming service, Apple Music, in 2016. Likewise, Google, who made significant inroads into the music industry already with YouTube’s partnership with Vevo, entered the music-delivery industry with technologies that power new cloud-based streaming and music-syncing facilities for Android. Google’s 2010 acquisition of music and photo-streaming services (such as Catch Media in February 2010 and Simplify Media in May 2010) challenged Apple’s dominance on the terrain of mobile music, and culminated in a paid on-demand streaming service, Google Play, in 2013. As well, the music-download store (Google Music), linked closely with Google+, used social networking platforms as a word-of-mouth recommendation vehicle. In October 2015 Google launched its all-in-one streaming service YouTube Red, a subscription tier for its popular audio and video service. With these technologies, Google thereby became a provider for content delivery to a mobile device in any location (a rental car in another country, for example), offering users all-access virtualized playlists, and so forth, in the context of ultramobility. In March 2011, Amazon likewise launched a cloud-based service, called “Cloud Player,” which offered free online storage space for songs purchased on Amazon. Smaller companies currently operating on the same model include Tidal, Rdio, Audio Galaxy, Rhapsody, Audio Box, and Grooveshark.
- 6 Streaming automated playlists on platforms such as Spotify, YouTube, and Tidal became the dominant mode of musical listening by the second decade of the 21st century. Given the archaic marketing and promotional techniques of the traditional music labels, industry leaders experimented with a variety of release strategies—from limited releases on specific streaming services (such as Tidal in the case of Kanye West’s 2016 release of *The Life of Pablo*) to premium cable channels (such as HBO in the case of Beyoncé’s 2016 release of *Lemonade*)—while the very concept of an album became deeply digital—melting, in Ben Ratliff’s words “into the water world of sound.”⁷⁵ Skeuomorphism ruled the day. For example, by 2016 the decreasingly relevant “album” concept was redefined by the Record Industry Association of America (RIAA) as 1,500 on-demand audio streams. Even though the relationship of a particular number of downloads to the conceptual commodity structure of an album was entirely derivative, the industry persisted in its attempt to retain its traditional selling structures and attendant reward programs.
- 7 Interestingly, streaming services would become mobile in another way as well, specifically interactive and customized to individual consumption, whereby variously crafted algorithms generate playlists suited to aesthetic preferences figured across malleable axes. For example, the metrics employed by Pandora—a free (advertisement-

based) streaming service for smart phones and computers used by over 35 million listeners in 2009, 30 percent of whom connected via phone⁶—involve hundreds of elements traversing the terrain of music theory (metric beats per minute, rhythmic topoi, instrumentation, formal criteria, harmonic patterns, and so on), psychology (emotional valences, implied bodily comportments, and so on), and sociology (genre attributions, degree of accessibility, and so on). Noticeably absent from Pandora’s metrics, for example, is the collaborative filtering that characterizes a large part of the musical blogosphere. The website Hype Machine, for instance, a blog aggregator grounded in a numerically derived measure of popularity, emphasized the cultural-contextual determinants of taste-communities. The number of playlists produced by these differently nuanced filters is considerable. But as smart phones become increasingly personalized, the selection of data points for cloud-based computing is itself likely to become flexible—expanded, contracted, shuffled, or otherwise repurposed for a host of algorithms attuned to ever-finer gradations of service-oriented consumption.

Curse of Ultramobility

- 8 Academic and journalistic commentary on emergent mobile technologies often explores their personal, social, and cultural valences, as well as the consequences and effects of users’ interactions with them. This commentary is grounded in a particular theoretical position, which in turn implies a kind of warning or embrace of the new socialities imbricated in technological developments. On the one hand, the commentary presents a range of critique of internet-enabled mobile devices, such as the latter’s distracting character, luring users away from traditional modes of interaction;⁷ or the fragmentation of social communities provoked by magnified personal differences hitched to narrowing bands of search-based information;⁸ or the flattening of consciousness produced by the addictively interactive, but ultimately cursory and superficial, reading, viewing, and listening habits encouraged by online devices.⁹ Such commentary has a well-established history. Pursuing only the first line of critique, we find, already in the mid-1930s, Walter Benjamin’s descriptions of the effects of technological reproducibility on the cultivation of the senses, noting the “state of distraction” produced by then newly reproducible, and hence mobile, media—that is, artworks set technologically adrift from their spatial and temporal coordinates to “meet the beholder halfway.”¹⁰ Benjamin’s state of distraction, identified here as an enriched and tactile sensorial engagement and paradoxically linked to a collective, co-productive, and critical experience, was the target of Theodor W. Adorno’s pointed critique. In stark contrast to Benjamin, Adorno warned against the effects of the repetitive and superficially standardized music and art of the culture industry, endorsing instead concentrated absorption as a pathway to dialectics.¹¹
- 9 More recently, media theorist Friedrich Kittler noted how, in the context of encroaching mobile technology, humanity “externalised first its motor and sensory interface, and finally its intelligence, in technical prosthetics,”¹² thereby emphasizing an escalation in recent decades of a technologically tethered human subject. The idea that advances in communication technologies contribute to diminished subjectivities is taken up by the popular press as well. In step with Nicholas Carr, Thomas Friedman argues that attention spans are disrupted as interconnections proliferate: “We’ve become absorbed by shorter and shorter-term thinking—from Wall Street quarterly thinking to politician-24-hour-cable-news-cycle thinking.”¹³ For Friedman, mobile communication comes at a

considerable social cost, as “situational values” begin to trump “sustainable” ones in a time of crisis. Less schematically, Sherry Turkle addresses the problematics of artificial intelligence and the tethered self directly in the context of mobile communication devices; a self newly characterized as being in a state of “always-on/always-on-you.”¹⁴ In particular, Turkle notes the alluring sense of productivity, efficiency, and mobility afforded by increasingly interactive technological devices such as the BlackBerry.¹⁵ Through a psychoanalytic optic, Turkle issues a warning about how such relational technologies encourage a distracted mindset characterized by “continuous partial attention,” that diminishes the quality of relationships.¹⁶ Most alarming, Turkle concludes, relational artifacts create new sensibilities and socialities grounded in technologically surrogated relationships. In the author’s words, these artifacts “represent their programmers but are given autonomy and primitive psychologies; they are designed to stand on their own as creatures to be loved.”¹⁷ Mobile technologies, in short, distract from and distort the quality of traditional human relationships.

- 10 The idea that relational quality is all too frequently compromised in the context of the digital network is regularly taken up by cultural critics as well. The freelance journalist Chris Weingarten, for example, describes how the algorithmically defined harvesting mechanisms that trawl the web to identify musical trends and gauge popularity forgo quality in the name of quantity.¹⁸ While designed to bypass both the rigid hierarchies of the music industry representatives and the chaos implied by the hyperlinking traces of “the mob,” these mathematically derived results deliver the surrogated musical taste of “the internet hive-mind,” which is co-terminus with search-engine optimization. Jaron Lanier describes the emergence of such optimization (data aggregators, metablogs, etc.) as an online power struggle: “[Digital Maoism] rewards the one preferred hierarchy of digital metaness, in which a mashup is more important than the sources who were mashed. A blog of blogs is more exalted than a mere blog. If you have seized a very high niche in the aggregation of human expression [...] then you can become superpowerful. The same is true for the operator of a hedge fund. ‘Meta’ equals power in the cloud.”¹⁹ Lanier’s position is echoed by industry commentators, who recognize the rising value of gigantic, easily searchable databases for music: “Eventually, the most successful music companies may not be the ones that create, play, or sell music. Rather, they may be the ones to collect the most music data.”²⁰ As it was for Adorno, whose industrially administered culture produced standardization, search-derived taste, for Lanier and Weingarten, becomes by definition “bland and middling;” a function merely of speed (mounting content first) and quantity (mounting content in as many places as possible). Where Turkle laments the loss of the technologically untethered self, Weingarten laments the loss of the technologically untethered “stumble culture,” which opens into musically unknown territory by way of qualitative criteria loosened from the inertial tendencies of search. Mapping Weingarten’s terms back onto the emerging cloud-based music delivery systems, it should be noted that algorithmic ranking and sorting methods are central to the process of streaming playlists online. Although not all mathematical algorithms are equal (some may not be based primarily on the logic of click-through rate-based search, others may be designed with nondeterministic or randomized elements, and so on), the task of revealing the grammar of their data-processing formalisms (especially in light of the naturalized opacity by which they are experienced by users) becomes increasingly urgent.

- 11 Further lines of criticism addressed to emerging patterns of digital production and consumption of music are related to their social effects. Here critics tend to focus on the socio-cultural fragmentation implied by the personalized use of mobile musical players. This line of argument often gains traction in the context of normative notions of public life no less than normative notions of music's aspirations toward communal cohesion. For example, the global surge in usage of mobile musical players is shown to corrode prosocial behavior by isolating individual users from the ambient environment, thereby flattening modern communication—reducing social contact to mere status-display practices, for example.²¹ Michael Bull's extensive, quasi-ethnographic investigation of emerging geographies of listening likewise emphasizes the private, essentially escapist dimensions of listening habits on mobile devices. Here the flattening effect of such behavior is articulated less to communication practices and more to listeners' own experiences of contextual complexity. The iPod, for example, allows "consumers to create their own soundworlds [that] simplify the user's environment."²² In this view, as users enter into what Sophie Arquette would call an "acoustic enclave"—"a modern-day fortress to preserve privacy"—their actual surroundings retreat from their (frequently oppressive) complexity, issuing instead qualitatively new, self-regulated, affective experiences.²³ Arquette even argues that the condition of music itself is undergoing a metamorphosis in the process. Ostensibly the most "liquid" (or "fluid") artform, music, in its mobile usage, paradoxically comes to represent the least mobile of social functions: the reassuring "physical presence of home territory."²⁴
- 12 Commercial responses to social needs of this sort instructively confirm these lines of argument. The proliferation of noise-canceling headphones and earbuds in recent years, to facilitate either silence ("antinoise") or listening to music at lower volume levels, betray a demand, on the one hand, for screening out and controlling soundscapes, and on the other, for opening into surrogate enclaves of temporary respite. The print advertisement for Honda's 2010 Acura Advance exemplified this trend toward sound-filtering devices for mobile technologies. Titled "Our Speakers Can Create an Interesting Sound Silence," the ad featured three empty (treble clef) musical staves on an otherwise featureless gray-white backdrop.²⁵ Similarly, the aesthetic minimalism and the curved ergonomic simplicity of Apple's designs for mobile devices harness the reassuring logic of the elementary task in a cluttered environment. This simplicity also relates to the industrial demand for invisible artifacts, to which I will return. Here it suffices to point out that design elements thus project mobile devices (such as the iPod, iPad, and iPhone) as sleek and refined accessories, whose portals effortlessly simplify relations with an increasingly complex social system and informational network.
- 13 Apple's conspicuous investment in iPod's silhouette advertisements that flooded billboards and screens across the globe in the first decade of the twenty-first century—thereby visually marking an era in the unfolding history of the music business—likewise betray a keen awareness of a two-fold logic: the need to fortress the self from incursions of unwanted sound and to unleash otherworldly experiences thereby. The relatively simplified and generalized physical details projected by the iPod's dancing bodies (not, it should be noted, simplified and generalized enough to include fat or old bodies), set against the plain primary colors of the background, vividly captured this stripped-down aesthetic. Aesthetic minimalism here paradoxically recapitulates the very flattening of social expression to mere status-display decried by du Gay and Fortunati in their criticism of mobile technologies. As if to compensate for this gentle contradiction, the ads also

offered heightened private experiences unavailable to the nonuser. One early television ad, for example, featured an iPod-wearing pedestrian walking down the street in calm strides, but projecting a shadow-self dancing in musically immersed ecstasy. This compensatory value, however, recapitulates the very echo-chamber effects, isolation, and concomitant social fragmentation denounced by Carr (and, to a lesser extent, Auletta) in their analysis of digital technologies. In almost Schopenhaurian motifs, the iPod silhouette ads shuttled between the perils of this twin logic; at once projecting an act of social distancing or withdrawal and proffering intoxicating surrogate metaphysics. In both cases, commercial advertising thereby paradoxically hitches a ride on a particular strand of cultural pessimism.

Promise of Ultramobility

- 14 On the other hand, academic commentators and journalists have, with matching conviction, equally celebrated the new personal, cultural, and social freedoms afforded by emergent mobile technologies. At a broad level, commentators like Yochai Benkler and Clay Shirky emphasize the positive effects of the social interactions facilitated by multiple communication interfaces today. Far from drifting toward social solipsism, social media technologies, for Shirky, afford new modalities of sharing, conversation, collective action, and creative production, which unleash a hitherto untapped “cognitive surplus,” and transform thereby the passive consumption patterns of the past into a monumental assemblage of collaborative production.²⁶ Adopting an almost Bergsonian riff, Shirky even argues that, in the context of declining production costs, cultural artifacts, such as music, will lose their object-status and become purely expressive experience.²⁷ Benkler similarly argues that the decrease in computational costs, enhancements in digital signal processing, and network architecture will issue a new model of production sustained by collaborative volunteerism.²⁸ Benkler labels this model “commons-based peer production,” characterized by a digitally networked environment that “makes possible a new modality of organizing production: radically decentralized, collaborative, and nonproprietary; based on sharing resources and outputs among widely distributed, loosely connected individuals who cooperate with each other without relying on either market signals or managerial demands.”²⁹
- 15 Benkler offers various examples of coordinated nonproprietary collaborative activities, such as the institution of free software (or “open source”), which strategically deploys copyright and licensing law (the GNU General Public License) to foster collaboration; and open, peer-produced online reference tools, such as Wikipedia, whose content, analogously, is released under a GNU Free Documentation License.³⁰ Not surprising, both Shirky and Benkler detect in the automated averaging algorithms that disturb Weingarten enormous creative promise. Collaborative filtering in the context of nonscarcity, for Shirky, is the ultimate arbiter of true mass culture; it has “earned the right” to be popular.³¹ Likewise, in his discussion of NASA clickworkers engaging a collaborative project involving highly modularized individual tasks, Benkler writes: “[The organizers] built in redundancy and automated averaging out of both errors and purposeful erroneous markings.”³² Indeed, Wikipedia’s use of automated robots (“bots”), guided by algorithmically defined tasks to combat vandalism, largely facilitates the monumental task of editing, maintenance, and administration of the site;³³ it arguably account for the site’s robustness and overall reliability (certain notable exceptions

notwithstanding). Where mathematical automation brings down a curse on some modes of creative practice, therefore, it holds up a promise for others.

- 16 On the terrain of music and sound specifically, techno-affirmative academic criticism and journalism tends to emphasize the social affordances of personal digital devices, in particular new modes of individual autonomy and socialization—the ability to manipulate both the ambient environment through personalized music and sound and the form that social interactions may take within social spaces. This is the flip side of the pessimistic coin advanced by Kittler, Turkle, du Gay, Fortunati, and others, which is also paradoxically invoked by various commercial branding campaigns. Instead of interpellating “always-on / always-on-you” sociality, for example, Naomi Baron demonstrates how mobile sound applications actually facilitate a detethering of the self from perpetual contact. Enhanced technological capabilities thus allow users to adjust the amount of contact they make with interlocutors in increasingly sophisticated ways. Camouflage services, for example, designed to “provide background noise from a traffic jam, enable a user to say with authority, ‘Sorry, I’ll be two hours late. I’m stuck in traffic,’ while actually sitting at a café.”³⁴ Technologies, in this view, accommodate both enhanced communicative control and autonomy no less than increased social access and connectivity.
- 17 William Mitchell, likewise, re-articulates the potentially distracting effects of mobile information and communication technologies in terms of enhanced environmental control, emphasizing the active role users may take in manipulating the social mise-en-scène, thus stimulating and regulating personalized narratives in the context of partial detachment from the actual immediate environment.³⁵ Instead of delinking from reality by retreating into a sonic enclave (which in turn theoretically maps onto Kittler’s externalization, Turkle’s tethering, etc.), the acoustic elsewhere produced by Mitchell’s mobile music deepens the linkages between the actual and the virtual (in the non-Deleuzian everyday sense of the term): “any element of the surrounding scene may serve as a link to memories of past events and distant places, to narratives that you have heard and to facts that you have learned.”³⁶ Mobile devices, in this view, cultivate, rather than sever, new modalities of both being in and thinking about the physical environment, thereby encouraging an arguably more self-aware and engaged relation to it.
- 18 David Beer, writing against Bull’s image of a “utopian zone of exclusion” that envelops users of mobile devices, emphasizes the oscillating character of mobile listening practices and thus their fundamental embeddedness in the informational orders of the physical environment.³⁷ Mobile devices enable users to “remix the city,” actively tuning out various pre-given elements in favor of new experiential connections to the landscape: “This is where users move in and out of the varying, dynamic, and heterogeneous soundscapes of the city, to which they are inevitably exposed, but they may tune out this acoustic environment whilst remaining an integrated part of the sonic, informational and concrete structures of the city.”³⁸ Beer’s observation that mobile listening eludes the inevitable aspects of the actual acoustic environment rests on a well-worn trope grounded in the notion that music and sound cannot readily be shut out; in Marshall McLuhan’s terms, we are not equipped with “earlids.”³⁹ Dialectically speaking, we see here a malleable and particular agent pitted against a rigid and general structure: in short, mobile devices afford flexible and self-empowered (even “reflexively construct [ed]”) experiences within, and independent of, the “process generated and infrastructurally determined aural ecology.”⁴⁰ Tuned-out listening thereby enacts not

merely a retreat from, but also a gentle resistance to, imposed orders of sound and information.

- 19 Where Beer's optic shifts the social dimensions of mobile listening from its walled-off enclave toward a more porous and punctuated relation with the physical environment, commentators such as James E. Katz, Katie M. Lever, and Yi-Fan Chen argue for mobile music's outright prosocial attributes. With reference to *Apparatgeist* theory, which emphasizes the creative modifications and mismatches between producers' aims and designs and consumers' actual uses of normative technologies, the latter writers demonstrate how mobile phones and digital music players are often used as "interpersonal-bridging and community-building artifacts."⁴¹ In addition to their status-conferring effects and the environmental-conditioning effects, these technologies also assist modes of social collaboration, sharing and community building. For example, Katz *et al.* describe the sharing of playlists, the simultaneous listening via earphone-splitters, and the kinesthetic habituation attending the use of mobile devices in various social settings. To Katz's list of potentially community-forming uses of handheld devices should be added less formal peer-to-peer applications, such as undersound, Push!Music and tunA, which enable users to share music with people in their near vicinity. Instead of being connected to the Internet, these devices are connected via *ad hoc* wireless networks within mobile geographical settings.⁴² For Amanda Williams, Erica Robles, and Paul Dourish, these mobile social applications support "fleeting low-obligation interactions," which "invite users to participate in collective and imaginative experience of a 'public' setting"—an interactional scene not unrelated to the flexible social identities imagined by Benjamin in his Arcades project.⁴³ Further, the various quasi-Deleuzian social formations, such as the "flash mobs" where people meet in prearranged settings at an established time and dance to their personalized playlist ("silent raves") or perform music or dance routines, would not be possible without these new mobile technologies. To this list of emergent techno-social conduct should be added the many internet memes, often involving elaborations of dance-music formations (ranging from Psy's "Gangnam Style" in 2012 to Silentó's "The Nae Nae" in 2015), and the like. These new forms of musically-centered social interaction are closely linked to new modes of political organization and resistance, which Howard Rheingold calls "smart mobs." In these contexts, mobile technologies have the potential to "amplify, leverage, transform, and shift political power by enabling people to persuade and inform the thoughts and beliefs of others."⁴⁴ Far from begetting social fragmentation through increasingly isolated cultural consumption, mobile technologies may equally navigate interfaces between physical and virtual environments that amplify social encounters, foster community, and even resist the socio-political orders of things.

Divisible Mobility: Music in an Age of Cloud Computing

- 20 Although these writings have been presented here as either primarily techno-optimistic or pessimistic, most of them in fact narrate some dialectical drift between the curse and the promise of mobile technologies in our times. Michael Bull, identified here primarily with those who argue against the prosocial aspects of mobile music listening, for example, equally engages the utopian aspects of such listening. In one particularly daring chapter, for example, Bull even correlates iPod usage to the inherent mobility of music

via a Bergsonian model of consciousness—“based upon duration in which the notes of a tune melt into one another to produce an organic whole.”⁴⁵ Bull writes:

iPod users appear to be embracers of a Bergsonian world of free consciousness, a world in which consciousness is inherently mobile, fluid and in flux—and, hence, ultimately uncontrollable by others, the culture industry or society in general. [...] From a Bergsonian position the fluid nature of music itself, coupled with the structure of choice offered by digital technologies like the iPod, complements the very nature of the user’s consciousness, enabling them to construct an “individualized” relationship between cognition and the management of experience.⁴⁶

- 21 Echoing a sentiment found in Mitchell, Beer, and others, Bull even identifies in this Bergsonian-inflected iPod usage the promise of resistance to pre-given orders, arguing that enhanced “choice” creates a “conceptual distance from the structural organization of these products” (associated here with “the culture industry,” “society in general,” and so on).⁴⁷
- 22 Even here, focusing more closely on the figure of Henri Bergson in our times, we find academic discourse suspended between radically different modes of argumentation and interpretation. In other words, Bull’s is a noteworthy and idiosyncratic deployment of Bergson, who, if most recent academic commentary is a gauge, would have actively resisted the digitized modes of mobility to which Bull refers. Gianluca Colombo, L. Lawler, V. Moulard, and others posit the idea that “freedom is mobility” is perhaps Bergson’s best insight, but pure mobility, in Bergson’s view, is indivisible, radically delinked from identifiable nodal points of identification that characterize digital networks.⁴⁸ Suzanne Guerlac points out, for example, that Bergson was troubled by the possibilities of “mechanism inserted into nature” or of an “automatic ordering of society,” and offers a Bergsonian argument that demonstrates how the human body is itself threatened by new developments in mobile technology: “It undergoes electronic interventions and becomes fitted with prostheses, or nanotechnological interventions that blur the limit between animate beings and inanimate ones, the limit between the human and the machine.”⁴⁹ Guerlac’s Bergsonism emphasizes the indivisible, nonspatialized understanding of movement. “The indivisibility of movement implies the impossibility of the instant.”⁵⁰ For Guerlac, any attempt to (digitally) divide movement into its constituent points—bits, parts, or nodes—can only occur because of the illusion that movement can be mapped into space. Such mapping misses the “ongoing event,” amounting to little more than “representation.”⁵¹ In sum, for Guerlac, no matter how “Bergsonian” their experience may appear on a micro-level (facilitating, in Bull’s terms, “unparalleled micro-management of mood, environment and sound, permitting the successful management of the self through the contingencies of the user’s day,”⁵² and so on), digital nanotechnologies, irreducibly mapped onto spatialized macro-designs and infrastructures, cannot but produce a prosthetic, surrogate self. Jaron Lanier argues similarly against the spatialization of locked-in ideas about how software is constituted. Using MIDI and Unix as examples, he maintains such software expresses “too large a belief in discrete abstract symbols and not enough of a belief in temporal, continuous, nonabstract reality.”⁵³ The “mobilities” they afford, in short, are divisible, instead of indivisible.
- 23 Whether we read Bergson in the terms offered by Bull or those by Guerlac (and echoed by Lanier), the difference does illuminate an uncanny theoretical continuity, if not a political alliance, between the arguments mounted on both sides of the debate about the social impact of mobile digital technologies. In other words, Bergson’s critique of divisible

mobility draws attention away from the consumption patterns and everyday uses of mobile devices in all their *Apparatgeist* contrarianism, heterogeneity and diversity, and toward the enframing structural matrices that condition their technical possibility. The overarching intellectual focus on individual and social effects of nanotechnologies (whether pro- or contra-), in contrast, manufactures disinterest in all-too-concealed macro-structures, which include the (cyber-)infrastructural assemblages that invisibly support the various patterns of usage, the institutional maintenance of the technical systems undergirding these technologies, and above all the economic determinants at stake in such support and maintenance. In the words of David Ribes and Thomas A. Finholt, “the ‘immutable mobility’ of data—the holy grail of many CI [cyberinfrastructure] ventures—never persists outside the technical and organizational networks that sustain their meaning.”⁵⁴

- 24 For example, as servers scaled to cloud computing, their ability to store and search opened unprecedented possibilities for monetizing flows of online content. In other words, with millions of computers and servers processing searches, harvesting and analyzing data (monitoring music listening habits, for example), new business opportunities emerged in the difficult-to-track “invisible work” of delivery systems themselves.⁵⁵ An unprecedented digital architecture thus paved the way for monumental information-ranking companies to enter the content market. Corporate investment in music streaming should be read, above all, against these infrastructural developments; as attempts to control the increasingly centralized computing grid. The migration of data to enormously energy-demanding storage sites (such as Apple’s building in North Carolina, known as “The Orchard”) marks a shift away from the decentralization of the Internet and toward its corporate-controlled concentration. For many businesses, economies of scale now make it possible to outsource their storage needs and computer applications to these sites at much reduced cost. Mobile computing on a mass scale has followed suit. Paradoxically, then, the miniaturization of computers, whose uses on a micro-scale are demonstrably erratic and heterogeneous, is tethered to the monumentalization of the computing “cloud,” whose order on a macro-scale is increasingly technically standardized and economically homogenized. In the corporate struggle for control of the “internet of things”—an industry coinage that refers less to things *per se* than it does to internet-enabled platforms for learning behavior and gathering user information—the dialectical distinction between the heterogeneous, disseminated behavior of everyday practice and the incrementally ordered corporate infrastructures that monitor and automate that practice, cannot be underestimated.
- 25 The two-tiered character of dispersed consumption in the context of centralized production thus delineates new zones of visibility and invisibility. To invoke a question I raised in the context of a critique of Deleuzian postmodernism: Is not the argus-eyed and micro-capillaried digital network, its algorithmic surveillance attuned to ever-finer gradations of resonance between consumer desire and niche market production, the very lifeblood of Capital today? Transparently, the experience of “new participatory architectures of the Web” (which Yochai Benkler’s describes as a dispersed creative commons) is tethered, opaquely (i.e. digitized in a minefield of privacy “agreements”), to the algorithmic harvesting machine, which monitors and aggregates user-generated personal and intellectual information to companies controlling mainstream platforms; thereby delivering power to the hands of technology designers and their financiers.⁵⁶ What makes it difficult to leverage critical traction on the political and economic

determinants of infrastructure today is its surreptitious integration into the effortless habituation of the everyday; and its concomitant structural opacity. Guided by Martin Heidegger's philosophical analyses, for example, Zoë Sophia, Jonathan Sterne, and others, have shown how "container technologies," often coded feminine, are by definition concealed; "unobtrusively and incrementally ordered space[s] which can be taken for granted as a background for other activities."⁵⁷ While Heidegger largely teases out the giftlike, affordant character of his exemplary "thing" (a jug in this case), Sophia draws attention to the paradoxical affinity between the philosopher's analysis of this cultural item, understood in its delicate specificity, and the large-scale, abstract structures that are "standing-reserve" for aggressive exploitation in the resourced world, to which Heidegger draws ominous attention in his essay on technology.⁵⁸ Mapping Sophia's analysis back into the question concerning mobile technology, we find that the concealed (feminine) character of cloud computing servers—at bottom storage and ranking technologies for data—become, under these critical lights, extractive technoscientific utility grids.

- 26 For all the importance of uncovering them, the womblike, feminine character of container technologies should not be confused with feminism. Sophia's observation alerts us instead to the stealthy aspect of container technologies. As the extensive uses of portable microcomputers (linked to server farms) becomes an ambient aspect of living, and thus further withdrawn from users' awareness—issuing what Adriana de Souza e Silva calls an "age of calm technology"—the nature of agency and critical leverage likewise shifts.⁵⁹ It is instructive to note that computer scientists and technicians sometimes consciously deploy an uncannily Heideggerian approach to future developments in technology. During his tenure as chief scientist at Xerox PARC in the 1990s, for example, Mark Weiser claimed that the "most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it."⁶⁰ Already in the 1990s, Weiser predicted the coming of a third phase in the history of computers; an era characterized as one of "ubiquitous computing," the very antithesis of virtual reality: "While virtual reality puts people inside a computer-generated world, ubiquitous computing forces computers to live out here in the world with people." Souza e Silva elaborates Weiser's basic position thus: "The main problem [...] regarding PCs was their obvious visibility. They required too much of our full attention. A good technology, according to him, functions like a tool. A tool, when properly used, disappears as a function of its use, moving to the background of our attention."⁶¹ These motifs, almost like consumer reports lifted out of (a literalist reading of) *Being and Time*, are further echoed and elaborated by industry executives and representatives in describing trends in nano-computation; notably, the quest for intimate digital interfaces. In 2010 Luke Jansen, chief executive officer of Tigerspike, a media company with a specialization in mobile, for example, addressed the possibility of integrating digital chips in contact lenses and teeth.⁶² Likewise, Hiroshi Ishii, who pioneered tangible user interfaces at the Massachusetts Institute of Technology, pointed toward a new frontier for nanotechnologies: "the move into our skins / bodies."⁶³ Such technological futurism dreams of bursting what Julian Paul Assange calls the "air gap" between the cloud and the self.⁶⁴
- 27 In a context where full technological integration with the human body marks a profitable telos, academic writing and journalism oriented toward the nuanced socio-cultural dialectics of mobile sound—how new digital interfaces metamorphose our relations to

space and community, etc., whether articulated for or against—may become the ideological support for this airtight brand of corporate Heideggerianism. The question of infrastructure cannot be spirited away just because it has become digitally “virtual.” For example, the resistance afforded by Bull’s Bergsonian iPod experiences or Beer’s tuned out listening practices, which gain traction precisely because of their independence from the “structural organization” of the “culture industry”⁶⁵ and the “infrastructurally determined aural ecologies” of imposed orders of sound and meaning,⁶⁶ is in fact fettered more insidiously to vast, but opaque, infrastructural orders. It is as if these, basically postmodern, interpretative pluralities foster determined incuriosity toward the metanarratives that undergird fragmentation of socialities into plural dimensions in the first place. The liberatory, utopian aspects of mobile communication in our times become at most a compressed freedom; contained—in both senses—by a rigid, mandatory technological structure. Or, put differently, effortless habituation in divisible mobilities has entailed containing their emancipatory promise, bringing down a curse thereby.

From Disintermediation to Hyperintermediation

- 28 Music production in the first decade of the twenty-first century has shifted dramatically from a largely commodified industrial model to a radically decentralized one, grounded in peer-to-peer connectivity that increasingly gives the slip to the authority and control commanded by the official industry. The very centralization of the global music industry (which, by 2017, has reduced to only three major labels—Vivendi SA’s Universal Music Group, Sony Corp.’s Sony Music Entertainment, and Access Industries Inc.’s Warner Music Group), concurrently testifies to its consolidated power and its shrinking command over actual musical culture. In the older music economy, the media of music (its tangible forms—vinyl, cassette, compact disc, and so on) were fused with its contents (its sounding forms—songs, symphonies, and so on), which facilitated its efficient circulation as a physical commodity. In the newer economy, medium and content are increasingly delinked; the former effectively dematerialized; or, more accurately, micro-materialized, which is to say transformed from an actual (tangible) medium to a seemingly virtual (digital) format. The virtualization of music parallels the shift toward ever-miniaturized, and therefore concealed, technologies centered around mobility. This is not to say that music has become less “material” or somehow “disembodied” in our times (as Sterne and others have amply shown), but that its potential for commodification, in the limited sense of charging a price for discrete bits of music-informational data alone—is diminished.⁶⁷ Patrik Wikström notes: “As soon as some kind of information is uploaded to the Cloud, it is instantly universally accessible to everyone connected to the Cloud. In such a ‘friction-free network,’ the commercial value of providing access to an individual track is infinitesimally close to zero.”⁶⁸ Some commentators even argue that the music be offered as a utility, like electricity or water.⁶⁹ Indeed, although digital sales were briefly up at the turn of the first decade of this century, and vinyl retained a resilient sub-market, recording industry figures indicated a steep, and seemingly unstoppable, decline in overall unit-based sales of music in the first decade of the 21st century.
- 29 There is now widespread agreement that the demise of music’s industrial commodity form (LP, CD, etc.) is due to the appearance of new encoding formats in the 1990s, notably the MP3, whose lossy compression-decompression algorithm, grounded in psychoacoustic masking techniques, facilitated markedly smaller digital file sizes than those used on

compact discs. Interestingly, the MP3 format itself, developed in the 1980s by Karlheinz Brandenburg and others at the Fraunhofer Institute in Erlangen, Germany, was encoded as a commodity form, including, for example, digitally inscribed copyright protections in its code.⁷⁰ As Jonathan Sterne argues, the development of the MP3 was a conscious attempt by Fraunhofer and AT&T to achieve path dependency in the context of then emerging applications, such as Apple's Quicktime in the mid-1990s. For this reason, Sterne insists that the MP3, for all its invisibility, retains its thinglike character. This is an important point in the context of the emerging cloud-based music economy, to which I will return shortly. For now it suffices to say that, despite the MP3's commodified *raison d'être*, the arrival of open network technologies in the 1990s issued forth new practices of file-sharing, downloading, and sampling that quickly became pervasive, basically crippling the recording industry in the process. With the mainstreaming of peer-to-peer connectivity in the early 2000s, large-scale practices of exchange were no longer primarily governed by financial transactions. According to the International Federation of the Phonograph Industry, only one in twenty digitally downloaded musical tracks was legally purchased in 2008.⁷¹ It is as if the era of technological reproducibility finally ushered in its inherently simulacral, paradoxically decommodified, and aura-free medium: the MP3. In the words of David Hyman, CEO of MOG All Access: "There is nothing sexy about the mp3;" along with its withering aura, the commodity value of the MP3 melted into air.

- 30 As it is with journalistic coverage and academic commentary on the social effects of mobile music devices, viewpoints are divided about the effects these new modalities of digital connectivity (peer-to-peer sharing, the ubiquitous practice of downloading, streaming music services, and so on) have on patterns of music making today. Web 2.0 applications, featuring user-centered interactive designs that facilitate information sharing, interoperability, and the easy mounting of user-generated content (mashups, remixes, blogs, wikis, videos, etc.), have hosted new platforms for easily disseminated amateur music-making. Wikström, for example, detects a marked increase in generalized creativity in the context of Web 2.0: "For instance, research into the world of fan fiction shows that approximately 5% of a user population creates and uploads content, 12% comments on that content and 24% actively reads the content and the comments. Bradley Horowitz, VP at Google and formerly at Yahoo!, reports similar results from studies of user behaviour at Yahoo! Groups."⁷² These platforms arguably tap the hoped-for cognitive surplus, to which Shirky points, which is marked by an increase in collaborative, networked amateur music-making, variously referred to as "remix culture,"⁷³ "internet culture,"⁷⁴ "configurable culture,"⁷⁵ "network culture,"⁷⁶ "participatory culture,"⁷⁷ and so on.
- 31 Wikström describes the development of these cultures of peer-to-peer networking in terms of a qualitative shift away from the "traditional computer network topology," characterized by "client-server networking," and toward the "friction-free" topology, in which "both the distribution and the production bottlenecks are almost entirely gone."⁷⁸ Likewise, David Byrne argued that the music business (which he describes in terms of its medium alone—the business of "selling CDs in plastic cases") will "soon be over," because of the proliferation of web-based distribution mechanisms and the dramatic decrease in production costs for musicians.⁷⁹ Byrne offers various options for the creative musician, ranging from those entirely beholden to producers, promoters, marketers, and managers (such as the 360, or equity, deal) to the entirely independent self-distribution model

(“self-produced, self-written, self-played, and self-marketed”) and celebrates the widening potential given by these options: “For existing and emerging artists—who read about the music business going down the drain—this is actually a great time, full of options and possibilities.”⁸⁰

- 32 The sentiment was echoed by Michael Bracy of Future of Music Coalition, a nonprofit organization dedicated to the livelihood of musicians: “Who needs major labels, and Rolling Stone, and MTV? [...] Hundreds of bands, not a single superstar among them, all have significant followings and fanbases thanks to technology.”⁸¹ Arguably, artists ranging from Ingrid Michaelson, White Stripes, OK Go, Jonathan Coulton, Arcade Fire, Cactus Cuties, and Samantha Morton in the first decade of the 21st century, to Macklemore, Ryan Lewis, Goteye, Justin Bieber, Carly Rae Jepsen, and The Weeknd in the second decade, are testimony to the success of self-launched musicians in the twenty-first century.⁸² In short, for these writers, internet technologies have ushered in the possibility for economic disintermediation, in which traditional distribution channels (or intermediaries) have been bypassed, allowing musicians to engage their listeners directly. The collapse of the mass-industrial music sector thus witnessed the burgeoning of an independent, and more diverse, extra-industrial sector. For LaPlante, Bracy, Byrne, and others, the new technologies ushered in a period of unprecedented musical freedoms.
- 33 Some writers even suggest that musical socialities have been transformed by networked technologies, frequently with reference to the metaphor of a historical cycle. Music, in this view, has shifted from a more communitarian-oriented activity (the age before the technological reproducibility of sound) to a more a privatized one (the age of the recording industry) and now back again (the age of disintermediated network connectivity).⁸³ This line of thinking is frequently coupled to an argument about music’s cycling “from service to product and back again.”⁸⁴ In this context, live performances are frequently posited as the most important revenue stream for artists: “Under the traditional model,” writes Alice LaPlante, “artists would [...] go on to tour and perform live to sell more records. ‘Now it’s almost flipped, where people are selling the records and the digital downloads to promote their tours and ability to sell merchandise’.”⁸⁵ What for LaPlante is a “flip-flopped business model,” where musical scarcity no longer resides in technological reproductions but in live performances, marks, for David Byrne, a return to a more natural, instinctual relation to music as a social event, “communal and often utilitarian.”⁸⁶ Echoing Shirky’s emphasis on music as “experience rather than ownable object,” Byrne writes: “Music was an experience, intimately married to your life. [...] This betrays an eternal urge to have a larger context beyond a piece of plastic. One might say this urge is part of our genetic makeup.”⁸⁷ The general idea that “experiences,” rather than “possessions” are increasingly recognized as leading to a “happy” life is often echoed in the popular press.⁸⁸ Indeed, according to LaPlante, the live performance industry is booming—“a full 50% of all music revenues in 2007 came from live performances,” for example—, demonstrating the way digital technology is today leveraged to reap profits from live performance.⁸⁹
- 34 Whether music’s cyclic return to “experience”-centric “service” (by way of a century of plastic “product”) can be understood apart from its peculiarly commodified reincarnation in the 21st century is open to doubt. For example, Wikström correctly notes the prevalence of “option value blurring,” whereby promotion outlets simultaneously serve as distribution outlets for content, in a way that resonates with Sterne’s observation concerning the lingering “thingliness” of the MP3; that, while free, the MP3 is still

consumed as a product.⁹⁰ In other words, unlike radio and television, digital streaming services no longer function primarily as promotional and marketing tools, but are in themselves sufficient sites of musical content. By 2010, the listening habits of a new generation of listeners had shifted. Illegal file-sharing rapidly decreased and online music streaming became the norm. A 2009 study already observed the trend: “The research revealed that many teenagers (65%) are streaming music regularly, with more 14 to 18 year olds (31%) listening to streamed music on their computer every day compared with music fans overall (18%).”⁹¹ Generations of listeners identify the new distribution outlets as musical content per se, rather than as promotional or marketing guides to further consumption.

- 35 On the other hand, these trends point toward live events as the likely reference point for music’s monetization. The irony here rests in the way commentaries that endorse the value of musical processes, experiences, and liveness (over and against products, objects, and reproductions) situate the former precisely on the terrain of commodified exchange, while the “products” of technical “reproduction” have fallen increasingly outside of the circuits of such exchange. Praise for experiential liveness, whether grounded in its historical, psychological or biological *raison d’être*, may, in this context, act as an ideologically efficient mechanism for the new music market.⁹² Perhaps it should come as no surprise then that live performance was in fact the currently most monopolized sector of the music market by the second decade of the 21st century. The merger between Ticketmaster and Live Nation (the largest concert-promotion company in the globe, and a spin off from Clear Channel Communications in 2005) in January 2010 opened the way to exclusive deals with artists, such as “360 deals” (with Jay-Z, Madonna, U2, and others), and centralized control of ticket pricing for music concerts. Already in 2010, the *New York Times* reported that the “average price of a ticket to one of the top 100 tours has soared to \$62.57 last year [2009] from \$25.81 in 1996, according to Pollstar, far outpacing inflation.”⁹³ It is as if the digital network’s much-lauded decentralized distribution networks, newly unhinged from the control of the majors, suddenly betrayed their own promise, metamorphosing instead into a kind of auto-generative marketing tool for massive centralized companies who control the commodified “communal” live “experience.” Disintermediation thus paradoxically facilitated the accrual of ultimate economic power in the hands of monopolistic intermediaries.⁹⁴
- 36 Even more seriously, the promise of disintermediation in an age of user-generated web applications is premised on the idea that creative content be furnished at little to no charge. Indeed, as Weingarten points out,⁹⁵ self-mounted digital musical downloads are not in themselves lucrative: despite the hundreds of blogs, thousands of downloads, and millions of views of OK Go songs, for example, the band cannot effectively sell their music online. In answer to the question why musicians would “voluntarily put new music into such a system,” Shirky offers the following: “The more general answer [...] is replacement of greed with love.”⁹⁶ Much commentary about the emerging styles of music that flourish in these technological conditions resonates with Shirky’s countercultural rhetoric. In his book *Mashed Up: Music, Technology, and the Rise of Configurable Culture*, for example, Aram Sinnreich extols the virtues of the new nonlinear modes of intertextual music-making, whose patterns deftly recapitulate the networked architectures of new digital technologies. Likewise, in his *Sonic Warfare: Sound, Affect, and the Ecology of Fear*, Steve Goodman celebrates the manifold new genres blossoming in the context of digital remixes, mashups, and musics grounded in samples from “the riddim method of Jamaican

pop, to the sampladelia of US hip-hop, the remixology of disco, house, and techno, and the hyperdub methodologies of the hard-core continuum.”⁹⁷ From the perspective of music listeners too, the cornucopia of online listening can delink the musical ear from stratified conventions of old definable coordinates. Ben Ratliff, for examples, observes: “There is a possibility that hearing so much music without specifically asking for it develops in the listener a fresh kind of aural perception, an ability to size up a song and contextualize it in a new or personal way, rather than immediately rejecting it based on an external idea of genre or style.”⁹⁸ Not surprisingly, Ratliff extols the logics of remix and mashup, the fusion of “elements of two different songs;” their “stark musical oppositions.” For these writers, the convergence of consumer electronics and digital music distribution and consumption proffered a culture of productively disoriented creative praxis anchored in rhizomic intertextual fields of independently launched musical expression.

- 37 However, while it is difficult to assess because of the sheer quantity of online musical production, the artistic value of recent trends in new music is contested and in doubt. Far from detecting genuine creativity in the artistry of remix, mashup, and other genre-defying flows that build critical “question marks [...] into our hearing,” writers like Lanier, in contrast, detect a logic of decontextualized fragments in an assemblage to be exploited by others: “Pop culture has entered into a nostalgic malaise. Online culture is dominated by trivial mashups of the culture that existed before the onset of mashups, and by fandom responding to the dwindling outposts of centralized mass media. It is a culture of reaction without action;” “Where is the new music? Everything is retro, retro, retro.”⁹⁹ One symptom of the nostalgic turn was the paradoxical emergence of musical genres like glitch art, which aestheticized technological failures and malfunctions, and Vaporwave, which demonstrably engaged outdated sounds (from advertising jingles and video games to retro musical styles) to expressive effect. Arguably, by leveraging a kind of reflective techno-terroir, these genres critically engage with the consumer culture upon which they depend. Lanier, however, would regard this kind of artistic practice as derivative and reactionary. He connects the reactive musical culture to the reduction of personhood to illusionary bit-matrices, such as the “multiple-choice identities” organized by social-networking platforms like Facebook, and the erasure of viewpoints by “hive-mind” collaborations like Wikipedia.¹⁰⁰ Where Sinnreich and Goodman observe an explosion of new online creativity, Lanier notices a reactionary cultural soundtrack to recombinant, semi-automated processes that diminish qualities of human expression.
- 38 Questions of quality aside, the assumption that, because of the sheer proliferation of free music on the Internet, creators and users have the upper hand in the emerging economies for music should give us pause. Returning to Benkler’s example of the salience of nonmarket producers online, we find the following ethnographic sketch: “Imagine that we were using Google as our search engine, and that what we wanted to do was answer the questions of an inquisitive six-year-old about Viking ships. What would we get, sitting in front of our computers and plugging in a search request for ‘Viking Ships?’”¹⁰¹ Benkler shows that the first site is put together by an “enterprising elementary school teacher at the Gander Academy in Newfoundland,” which links to sites like “a Swedish museum,” and so on. The second link is to a Norwegian “Viking Network,” the third site is hosted by a Danish photographer, the fourth by a retired professor from Pittsburgh, and so on, all the way until the ninth site, which is “made freely available by PBS, the American Public Broadcasting Service.”¹⁰² Benkler associates this kind of activity not with traditional

incentive-based production but with the “dynamic efficiency” associated with the “will to create and to communicate.”¹⁰³ What Benkler’s casual survey misses is the way this communal ethos is inscribed in the market economy. On the one hand, Benkler misses the fact that the generous cultural protagonists in the “Viking Ships” search are largely either supported by traditionally salaried livelihoods (teaching, retirement, etc.), or sponsored by public, or even outright socialist, funding structures (Public Broadcasting Service, The Swedish government, etc.). On the other hand, Benkler misses the ways such “free time” work is integrated into novel approaches to the financialization of online praxis. It is in the context of new business opportunities associated with cloud computing, where millions of computers and servers are linked to human and nonhuman agents invisibly harvesting, processing, and analyzing data, that free work should be scrutinized.

- 39 Already before the advent of Web 2.0 technologies, Tiziana Terranova astutely detected the “increasing degradation of knowledge work” in the digital economy: “As a consequence, the sustainability of the Internet as a medium depends on massive amounts of labor (which is not equivalent to employment [...]), only some of which is hypercompensated by the capricious logic of venture capitalism.”¹⁰⁴ Updating Terranova’s diagnosis of free labor in our times, we witness the cool logic of crowd-sourcing as an integral part of new capitalist modes of production. In the first decade of the 21st century, for example, Netflix, the online movie rental company, shifted aspects of its marketing research away from in-house computer engineers, programmers, and statisticians (on payroll) to the collaborative commons (in competition): In quest of a recommendation software that could predict customers’ tastes in movies 10% better than their in-house software Cinematch, for instance, the company offered a million-dollar prize for the winning team. Aside from the winners (known as Bellkor, a global alliance of some thirty members), three years of labor, involving thousands of teams, from over 180 countries, missed the mark. In the words of Greg McAlpin, a software engineer (and leader of the runner-up team Ensemble): “Out of thousands you have only two that succeeded. The big lesson for me was that most of those collaborations don’t work.”¹⁰⁵ The simple calculus of such crowdsourcing is startling: Netflix paid for 0.1% (at most) of the total labor expended on the project. Of those paid, each person received \$11,111.11 per year on a three-year limited term contract. In return, Netflix obtained a 10% improvement in their predictive modeling algorithm.¹⁰⁶ This kind of “crowd-sourcing” is becoming generalized in the market today. Consider, for example, Amazon’s Mechanical Turk, which offers a flexible, crowd-sourced, workforce for specific tasks for on-demand, part-time projects, efficiently linked to its cloud computing functionality. Likewise, the website Crowdspring acts as an interface between companies and graphic designers and writers, promising an average of 110 entries per project. The economic logic is evident: for every successfully purchased design, we find about one hundred redundant ones. The list of platforms providing crowd-sourced opportunities goes on. Benkler’s utopianism is disturbingly accurate: The hive-like collaborative efforts, whose “costs of production is trivial,” may be the very lifeblood of the capitalism to come.¹⁰⁷
- 40 What Shirky calls love and Benkler calls “creative free will” amounts to the “free time” volunteer-production in the context of nonrival goods online. This is the unpaid labor that increasingly delivers content and data to profit-oriented mainstream platforms. Paradoxically, in the context of music-making, such nonproprietary volunteerism resonates with a host of 60s-era countercultural themes—the virtues of free culture, the

death of the author, the irreducibility of intertextuality, the flourishing of creativity, the productive dimension of reception and consumption, the demise of oppressive copyright protection, and so on—which come ideologically to signal a massive divide between the music industry and digital music users.¹⁰⁸ The surreptitious alliance between such postmodern freedoms and capital should not be underestimated. Quite apart from the well-established legacy of anti-establishment credibility afforded by countercultural rhetoric for the advertising and branding of commodities and services, brands themselves have also leveraged the tactile-behavioral logic associated with new technologies for their own ends. Gabrielle Cosentino, for example, points out how Apple tailored the launch of iTunes with a business plan “aimed at creating a balance between the industry and music listeners, and coupled with a communication strategy that spoke the language of youth, freedom, and innovation.”¹⁰⁹ The Apple advertising campaign, revealingly titled “Rip, Mix, Burn,” was thus able to gain traction on the tactile behavior of free culture (peer-to-peer sharing, downloading, etc.) to deliver audiences to their databank. While iTunes still represents an older model for the commercial delivery of music (in bit-size chunks, instead of cloud-based streaming), it is worth noting a downward trend as far as the per-unit revenues received by actual musicians is concerned. Byrne notes, for example, that, while iTunes returns a higher percentage of its revenues to artists (14 percent), Apple itself receives 30 percent; furthermore, the actual amount received by artists is less than what they would receive with a traditional CD.¹¹⁰

- 41 The point is that consumption practices wedded to the cool rhetoric of ripping, sharing, mixing, burning, and downloading (as if in disintermediated cyberspace) may nonetheless serve to deliver profits to a concentrated number of content-delivering intermediaries. As mobile technologies coupled with subscription-based streaming services become mainstream, and the concomitant stockpiling of music in user-controlled digital memory dissipates, unit-based revenues for artists has diminished much further, if not withered outright. While the economics of streaming are vexingly opaque, the measurable revenue streams toward actual artists indicate remarkably meager returns. Mode Records, for example, received less than one third of a penny for every stream on Spotify.¹¹¹ In 2013, many prominent artists began to testify to, and even protest, the failures of the streaming model, and the implications of its overall de-financialization for artists.¹¹² While it is not the central concern of this article, the peculiar monetization practices of music streaming relate to the ways content providers engage service providers. Instead of monetizing per stream, music labels tend to be invested in equity shares in the streaming services themselves. This means that revenues generated by advertising and subscription fees are proportionately divided up among equity holders and only then distributed to artists, according to variable agreements between artists and labels. Just as consumption is delinked therefrom, remuneration, in the era of streaming, is therefore delinked from the unit-based legal model meant to guide it. Given the mismatch between the flow of capital and investment, it is not surprising that the most powerful music streaming platforms, such as YouTube and Spotify, are also the lowest revenue-producing platforms for artists. As a result, even stars like Lady Gaga were locked into recording label deals that generated no revenue for the artist from streams on Spotify. Far from tending toward disintermediation, the old industrial intermediaries have effectively been transformed into or substituted by a handful of cloud-based hyperintermediaries.

All Work Aspires to the Condition of the Musical Work (dot communism)

- 42 As cultural expression is increasingly uploaded to advert-dependent cloud services, the artificial scarcity that facilitates its efficient economic functioning risks becoming undermined. In this sense, the crisis of intellectual property in the context of information production today could signal a terminal danger for capitalism itself. The problem of music's possible descent into a "nonrival" good is frequently allayed by writers with reference to Chris Anderson's concept of the "long tail," which graphs a probability distribution for retailing strategies that emphasize selling smaller quantities of more niche items in contrast to the traditional strategy of selling more items that are widely popular.¹¹³ The logic of the long tail is largely sponsored by the emergence of the Internet, which, through new efficiencies of distribution and search functionality, dramatically expands possibilities for connecting consumers with formerly hard-to-find items. Sinnreich, for example, notes that 60 percent of Pandora music playlists are on the flattened right-hand-side of the long tail (the side not counted by aggregators of taste, such as Nielsen's SoundScan), while Clear Channel playlists, more driven by centralized corporate interests and playola, are centered on the steep left-hand side.¹¹⁴ For Sinnreich, the long tail offers the opportunity for collective production falling outside of the mainstream to enter into economies of exchange. In other words, creative work that may have fallen off the radar of searchability under older technological conditions exists on the market, and, newly visible, may even migrate up the long tail.
- 43 Critics of the long tail emphasize the uneasy alliance between the logic of the long tail, advertising, and the "hive-mind"-oriented "open culture" of the future. Lanier, for example, argues that the alliance has resulted in a new kind of social contract:
- The basic idea of this contract is that authors, journalists, musicians, and artists are encouraged to treat the fruits of their intellects and imaginations as fragments to be given without pay to the hive mind. Reciprocity takes the form of self-promotion. Culture is to become precisely nothing but advertising. [...] Meanwhile creative people—the new peasants—come to resemble animals converging on shrinking oases of old media in a depleted desert.¹¹⁵
- 44 Likewise, Kevin Kelly notes that the long tail was highly profitable for large companies like Amazon and Netflix, but is ultimately of limited value for the individual creator. Recapitulating, with a cynical twist, Shirky's counter-cultural overtures to the labor of love, Kelly writes,
- I prefer to think of the Long Tail as being a tail to a different animal. We've misidentified the intangible being it belongs to. It is not the long tail of the Beast of Commercial Profits. Rather it is the long tail of the Dragon of Love. The love of creating, of making, of connecting, of unreasonable passion, or making a difference, or doing something that matters to ourselves, the love of connecting, giving, learning, producing, and sharing. It is important to know which tail we are wagging.¹¹⁶
- 45 If Lanier and Kelly are correct, the animal that is being wagged in the process is the anti-establishment ethos—the free culture of love—which mystifies the constitutive role played by centralized corporate infrastructures that extract value therefrom.
- 46 What does seem clear is that content providers and publishers are decreasingly relevant if they do not engage strategies to integrate their offerings with these new cloud-based

distribution platforms. How it will be possible, without some way of controlling pricing and distribution, for individuals or music companies to cover expenditures related to longer-term creative projects, the development of new artists, and elaborate studio productions, is uncertain. In contrast, it is unlikely that the proprietors of the major cloud computing centers will discourage the culture of unpaid creative labor, especially in the context of subscription-based streaming services; it is even less likely in the context of free (advertising-driven) services; and most unlikely in the context of search-based services. In the words of Carr, these providers “have a financial stake in collecting the [...] data we leave behind as we flit from link to link—the more crumbs, the better.”¹¹⁷ Lanier analogously points out that “ardent Silicon Valley capitalists” encourage “more and more services on a volunteer basis.”¹¹⁸ Lanier explicitly connects the ideal of free music and the demands of finance: “Silicon Valley has actively proselytized Wall Street to buy into the doctrines of open / free culture and crowdsourcing.”¹¹⁹ Long tail defenders echo this position; in the words of Chris Anderson, “despite the bluster about track records and taste [...] it’s all a crapshoot. Better to play the big-n statistical game of User Generated Content [the doctrine of statistical reliability through sheer magnitude], as YouTube has.”¹²⁰ The demise of economic value for creative labor as the privatized clouds that connect the crowd simultaneously garner profits should give us pause.

- 47 It is an irony that live performance—precisely that modality not intrinsic to the promise of networked digital technologies—is the only sector said to be economically thriving in the era after Web 2.0. Although it is difficult to ascertain the precise reasons for it, it is unsurprising that even this sector weakened in 2010, as the market was flooded by popular live acts (including the Eagles and “American Idols Live!” that could not fill venues and canceled performances).¹²¹ The surreptitious digital idealism of “free culture,” in slaying the beast of the commercial music industry, simultaneously signals the withering of a creative class of people—among them, what Lanier calls, the “musical middle class”¹²²—while simultaneously incubating new monopolies that thrive on free labor serving the new cloud-based architectures of the digital network.
- 48 In closing, it is important to note that effective proposals have been raised in recent years to address some of the problems posed by the new economies implied by cloud computing in an age of mobile devices. For example, Paul Borrill, Jim Herriot, Stuart Kauffman, Jaron Lanier, Ted Nelson, Bruce Sawhill, Lee Smolin, Eric Weinstein, and others, have begun to point toward fair and humanistic prospects for monetizing and financing the exchange of digital content online. Nelson’s early aspirations for the economics of the Internet respected the monetary (labor) value of creative content, however much this content had been transformed into digital bits. Nelson proposed that whenever a digital bit of music, journalism, video art, and so forth was accessed by a user, the maker of that expression should be paid a moderate sum. In Lanier’s words,
- As a result, anyone might be able to get rich from creative work. The people who make a momentarily popular prank video clip might earn a lot of money in a single day, but an obscure scholar might eventually earn as much over many years as her work is repeatedly referenced. But note that this is a very different idea from the long tail, because it rewards individuals instead of cloud owners.¹²³
- 49 Just as money retains its scarcity through limited printing, so too could cultural expression regain its artificial scarcity under this system. Lanier updates and elaborates Nelson’s ideas by arguing for a simple universal system for making fluid payments online, ultimately administered by elected governments. In addition, Lanier argues that copy-protection technologies should be reinstated (even if they cannot be perfected), banking

on the idea that most people would accept the kind of social contract that expects a moderate payment for a cultural item or expression that reward creators directly.¹²⁴ He proposes a number of possible directions such financing could take, including “telegigging” (technologically enhanced live performances), “songles” (dongles containing content, like music), and “formal financial expression” (modalities for clarifying the formal structure of finance).¹²⁵ In short, by ensuring that artists and creators are directly remunerated for their work (without passing along the siphoning path of a corporate intermediary), the multicapillared network of the Internet could fulfill its genuinely decentralized promise. Failing the kind of libertarian hypercapitalism advanced here, it becomes difficult to envisage a flourishing and sustainable culture outside of socialism.

- 50 Perhaps micropayments in some form, and other important proposals, are a means for staving off the cultural abyss toward which digital utopianism tends in this scenario. If music is to retain its cultural value, it may also need to retain an aspect of its thing-like, content-based character, which is otherwise gradually being eroded by mobile computers tethered to streamlined services alone. Also, if it aims to overcome its (increasing) ideological efficiency, the inertia of countercultural rhetoric (supporting the shift from musical “object” to “experience,” etc.) will need to be broken with new metaphors for resisting power.
- 51 Current theories of cognitive capitalism, immaterial labor, and biopolitical production increasingly recognize the prevalence in contemporary capitalist markets of flexible labor forces cooperating in a kind of communalist (or commons-based) sphere of production. Building on the work of Maurizio Lazzarato, for example, Paolo Virno demonstrates how the ideological demands of post-Fordist neoliberalism necessitate new modes of subjectivity that upend traditional Marxist theories of alienated labor in the context of capital’s abstract industrial imperatives.¹²⁶ Far from reducing, or disciplining, the socially interpellated subject (imbricated in collective norms, familial relations, kinship networks, ethical systems, historical debates, etc.) to an abstract, autonomous self (internally motivated, asocial, and apolitical), the neoliberal subject is in fact enjoined to pursue work that is communal, authentic, expressive, spiritual, and collaborative. Not only does the piecemeal, self-employed work proffered in the context of crowd-sourcing, practically by definition, demand a nonalienated relationship to that work, but full-time employees are increasingly expected to express such a relationship within the traditional workplace as well. As a recent study shows, corporate productivity and performance is a function of self-reliant, pliable workers that demonstrate initiative; workers that “put on a happy face,” offer “positive thought [...] or feedback,” “show flexibility,” and so on, in the workplace.¹²⁷ In other words, nonalienated, neo-individualistic subjectivities are economically necessary for the efficient ideological functioning of capitalist cycles of accumulation today.
- 52 The traditional mechanisms of job-placement are hereby replaced by precarious employment possibilities, most effectively actualized by what Virno calls a “postworkerist” subjectivity: a concern with “‘keeping in touch,’ with ‘being around’ (that is, eternally available), with ‘seizing the unexpected opportunity,’” and so on; a subjectivity caught within a network of diverse interlocutors and rich with psychological nuance.¹²⁸ While the precise linkages between nonalienated creative (musical) work, whose socially necessary imbrication in such networks predates the digital age, and the general transformations of labor socialization today are yet to be mapped, the

resemblance is striking. Labor processes in the digital age are looking more and more alike. The production by information and knowledge workers—including journalism, telecommunication, information technology, design, and other cultural communities—is approximating, as it were, the condition of musical work. As it is with musical work, creativity, open-mindedness, initiative, entrepreneurial skill, originality, individualism, and innovation are common subjective preconditions for employment in the context of intermittent, freelance, and temporary tasks afforded by the independently networked environment. The new subject of capital is not that of law-abiding servility under the oppressive gaze of power, but instead decentered, innovative, flexible, and networked. Michel Foucault's organizing concept-metaphor of the panopticon has been curiously inverted precisely in the age of total surveillance. Lazzarato characterizes such metropolitan immaterial labor as precarious, hyper-exploited, mobile, and hierarchic, and detects within the creative class the appearance of an intellectual proletariat.¹²⁹

- 53 It is in this sense that musical production today—grounded, almost by definition, in free, authentic expressive values, communal reciprocity, friendship networks, and so forth—is in the vanguard of immaterial production for information/knowledge workers generally. As shown earlier, digital media in the 21st century have ushered in widespread new online *habiti*, which, in turn, have proffered new networked socialites. In the large-scale context of enhanced digital efficiencies (in delivery, experience, etc.), musical production becomes a kind of model for the self-employed, creative worker. Given the constitutive dependence of musicking on community (or, put differently, on the publicity-accessed public), this model becomes selectively, and deceptively, (in)visible within the network. On the one hand, online communities bear witness to intermittent musical successes (self-launched artists, flash mob events and parties, audiovisual memes, viral videos, etc.)—which serve as an alibi to the allure of free, entrepreneurial laboring activity—while, on the other hand, a vast basin of disjointed creative labor, standing-reserve within rhizomic networks outside factory walls for *ad hoc* projects and services, is concealed from all visibility. It is the private, richly subjective, invisible crowd that proffers new forms of capture for the increasingly privatized invisible cloud. The question is, what kind of storm will be precipitated as the evaporating crowd increasingly serves as nervous system for the accumulating cloud? Can these new subjectively inflected laborers—the creative commons in production—open up production to the commons? Or do the creative commons merely innervate capitalist industry and services? Has a new anthropological reality—a generalized creative communism (or communalism) within capitalism—morphed into a kind of communism of capitalism; or more presciently, a communism for capitalism?

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NOTES

1. This article is an expanded version of an earlier essay, "Divisible Mobility: Music in an Age of Cloud Computing," originally published in *The Oxford Handbook of Mobile Music Studies*, Sumanth Gopinath and Jason Stanyek (eds.), New York, Oxford University Press, 2014, p. 75-102.
2. SRIVASTAVA Lara, "The Mobile Makes its Mark," in *Handbook of Mobile Communication Studies*, James E. Katz (ed.), Cambridge (MA), MIT Press, 2008, p. 27.
3. Although it is far from universally adopted, mobile communication has made a considerable impact in developing nations as well, dramatically dwarfing the impact of the internet in those regions. Internet penetration in the continent of Africa, for example, was less than 1 percent in 2010, while cellphone usage increased exponentially, reaching over a third of the population (SMITH, David, "Africa Calling: Mobile Phone Usage Sees Record Rise After Huge Investment," *The Guardian*, October 22, 2009). Likewise, on a global scale, despite the overall paucity of fixed-line infrastructure, mobile subscription in developing nations has risen from 12 million in 1995 to over 1.15 billion in 2005. In the least developed countries, cellular services (such as CDMA and GSM-type networks) outpace fixed-line services (copper networks) by a factor of seven (see SRIVASTAVA, Lara, "The Mobile Makes its Mark," p. 23; and DONNER, Jonathan, "Shrinking Fourth World? Mobiles, Development, and Inclusion," in *Handbook of Mobile Communication Studies*, *op. cit.*, p. 30-41). It is true that patterns of mobile diffusion are uneven, often replicating and entrenching zones of poverty, illiteracy and geographical isolation; thereby producing "structurally irrelevant" producers and consumers within the global economy (see CASTELLS,

Manuel, *The Rise of the Network Society*, Cambridge and Oxford, Blackwell, 1996, p. 135; and DONNER, Jonathan, “Shrinking Fourth World?,” p. 30). Yet the ascendancy of basic, widespread, affordable mobile connectivity, and its concomitant naturalization, mainstreaming, and, above all, structural integration into economic networks of production and exchange, is inevitable today. To be sure, the use of mobile communication in developing nations differs considerably from that of the developed nations. In these regions mobile devices tend to be cheaper and boast considerably fewer applications than do smart-phones in developed nations. Users who cannot afford a mobile device frequently depend on communication centers to send text messages and make calls, and, for those who do own them, various cost-cutting techniques are adopted. For example, in Ghana people use their phones only for incoming calls (which are free with most prepaid business models); or users elude costs by “flashing” an agreed-upon ringing signal to communicate messages without actually speaking (OVERÅ, Ragnhild, “Mobile Traders and Mobile Phones in Ghana,” *Handbook of Mobile Communication Studies*, *op. cit.*, p. 48). Nonetheless, with improvements in connectivity, broadband access, and affordability in these geographical areas, mobile devices, with enhanced computational capabilities, have become an integral aspect of social, national, and economic life in these zones as well. Occasionally, digital networks in the developing world have even outpaced those in the developed world. In Kenya and Tanzania, for example, M-Pesa, a mobile phone-based system for money transfers and microfinancing, was launched in 2007 by large local network operators. Before bitcoin could become mainstream in the industrial West, M-Pesa had become the dominant form for financial transactions in these African nations.

4. See VIRNO, Paulo, “Post-Fordist Semblance,” in *SubStance*, no. 112, 2007, p. 42-46; and LAZZARATO, Maurizio, “Immaterial Labor,” in *Radical Thought in Italy*, Paolo Virno and Michael Hardt (eds.), Minneapolis, University of Minnesota Press, 1996, p. 133-150.
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38. *Ibid.*, p. 854 and p. 860.
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ABSTRACTS

Music production in the 21st century shifted from a largely commodified industrial model to a radically decentralized one, technologically facilitated by new efficiencies in search of functionality, delivery, and peer-to-peer connectivity. In the older music economy, the media of music (its tangible forms—vinyl, cassette, compact disc, etc.) were fused with its contents (its sounding forms—songs, pieces, etc.), thereby facilitating their efficient circulation as physical commodities (grounded in licensing agreements, copyright protections, and so on). In the newer economy, medium and content are increasingly delinked; the former is effectively dematerialized (or, more accurately, micro-materialized as virtualized format), thereby posing new challenges to law and policy governing musical creation, distribution, and consumption. In the context of music's new technological prostheses (digital recording studios, on-demand streaming services, algorithmic aggregators, and the like) the question of equitable sources of revenue for musical labor has re-surfaced as a central debate in our times. The article assesses the promise of disintermediation in relation to new formations of labor, characterized by increased entrepreneurial reliance on flexible and globalized networks of production and distribution.

INDEX

Mots-clés: Digital Music, Music Industry, Streaming, Music Economy, Disintermediation, Immaterial Labor

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