Soundfile Listening: Future, Experience of Time, Management

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In soundfile listening, listening to music is technicised and managed. We encounter listening to music here not only as art[1] or cultural practise.[2] In soundfile listening, listening to music is increasingly becoming an economic issue. The management of listening [*Bewirtschaftung des Hörens*], however, does not only consist in economism. In addition to capitalisation and economisation of perception, in addition to exploring listening as an exploitable resource, management also implies culturalisation; that is, the transformation of a supposedly universal human capability into a cultural-specific capability. In managing, listening economy and culture come together. The process of managing listening, which also includes soundfile listening, began already with the increased development of auditory technologies and media — like the telephone and the phonograph — in the late nineteenth century. Ever since then, listening has been co-organised by technologies and ever more listening is done via instruments. In the case of contemporary soundfile listening, the instruments are smartphones, apps from streaming services, and headphones, which are increasingly being activated in the service of sound, for example, by eradicating background noises or adapting what has been heard to the individual listeners. In soundfile listening gigantic catalogues of music define what there is that can be listened to. Playlists point up personalised paths through these catalogues. Such paths are then upgraded in actual listening situations with the sound on the soundfile being fine-tuned by apps and headphones. Finally, soundfile listening to music is defined as a "social" event whereby "social" primarily refers to the "social" in the so-called social media and is operationalised through the processes of "sharing", "liking", "following", and possibly commenting on.[3]

My contribution addresses a particular aspect of soundfile listening: the time experience specific to this type of listening. Soundfile listening is strongly oriented on the question of what audio track will come next: that which in soundfile listening will be heard in the future, however, will then have come from the past. Moreover, with soundfile listening things are constantly being found that had not been looked for, but which —without the subject knowing it — are desired. In soundfile listening past, present, and future are linked in a complex way. Here it seems to me that a strange relation to the future, a strange experience of the future characterises soundfile listening: in soundfile listening the future is seldom open and undetermined, but for the most part already present or even past. This paper is about the three future times of soundfile listening: (I) the past future, (II) the present future, and also (III) the possible opening up of the future. It is these concrete forms of the future that

distinguish the specific time experience of soundfile listening. Especially the first two future times and the time experiences they shape are managed by streaming services to a high degree. With the third future form there could be a hint of resistance to this management.

The experience of the future outlined here means that soundfile listening problematises the history of listening. The history of listening engages with the past. It possibly seeks the past in the present; that is, the old within the new. Of course soundfile listening has a history, too. Within the historical context, for example, one can make out a certain "radioness" of streaming services, and they can be understood as remediating the format of radio for digital media;[4] playlists are not only found in streaming services but also on the radio, in jukeboxes, mixtapes, and with DJs;[5] moreover, lines of tradition can be drawn between digital music catalogues and vinyl collections and archives, between practises of cataloguing and practises of collecting.[6] Besides having a history, soundfile listening also has a future. This future encompasses not only the future present, which interests trends market research, but also the present and the past future. These are managed by the streaming services themselves and are decisive for soundfile listening.

To get a better view of the future of soundfile listening, it cannot be situated in historic times. For then only its past would become visible. A critique of historic times is also found in music historiography and media studies, especially in media archaeology. There, concepts of musical times and media times are taken into account with a view to problematising historic times. These musical and media times and their links to listening provide a background against which the contours of soundfile listening become sharper. The time experience of soundfile listening is shaped by music, media, and management.

Listening and (Ahistorical) Musical Time

Whoever looks at the clock while listening to music has already lost. Or at least has lost the time that musicologists, music critics, music lovers, and music fans never tire of invoking and calling upon as "musical time". It is frequently stressed that musical time is fundamentally different to all other forms of time, whether these be everyday time, work time, media time, or simply clock time. To describe the different forms of musical time, musicology has a raft of different terms — tempo, rhythm, time, meter, groove, swing, beat, pulse — and differentiates between cyclic-repetitive and linear-progressive, between intensive and extensive, between organic and mechanic, between "smooth" and "striated" time.[7]

In historical musicology based on art history one finds the almost Romantic proposition of musical time "abducting" listeners from "reality time": "Musical time is 'composed' (compound) time; that is, time organised down to the last detail, a time of 'composed experience', which in the process of aesthetic identification is able to eradicate the reality time towards it".[8] Musical time is situated in the musical work; it is "as a time experience mainly fixed in the object, in the music itself".[9] Thus passable music listening can be characterised as comprehending this time; that it orients itself and unfolds temporally accordingly. For music historiography, however, the assumption of a time fixed exclusively in the music leads to the problem that this musical time must be distinguished from historic time, from the time of history: "A musical opus originates historically, but the form of time that emerges makes it appear 'time-transcending'; as something that cannot be completely there at any place in history, that cannot be completely at home there".[10] To this paradox can be added that for musical works as musical monuments an "appearance of ahistorical transcendence" can be assumed, which in turn ensures that these works drop out of chronological historical time.[11] Musical works and monuments, therefore, should be time-less with respect to historical time, but not to musical time. For the latter, it should even be able to function as a timer because it gives rise to a new form of musical time. For engaging with listening to music, this means that now it not only has to be defined historically, but also musically.

Thus in musicology the emphatically understood musical time is distinct from the historical time, as well as from measurable and objectifiable time forms like clock time. In spite of the occasional sensitive sneer at "mechanical" time forms, musical time shares with clock time the property that both are objectified, albeit in different forms: the one through the technology of the clock, the other — as described above — in the musical work. Time that is objectified in a musical work is for the philosophy of music and historical musicology — to phrase it cautiously — not so much time that is perceived, that is, a specific form of the subjective experience of time or subjective temporal experience. Rather, it is supposed that it is determined by the "inner time form" of the musical work[12] or "fixed in the music itself"[13] It is "not merely time experienced".[14]

Musical time forms have to be differentiated from these objectified time forms, for they are rather closer to the subject: especially the phenomenological musical time experience and the psychological musical time perception. Also, in the case of phenomenological time experience with its protentions and retentions, we find claims of its specificity with respect to historical time: "The sense of time and motion of the music concurrent in the situation is not historical. Musical time is not historical."[15] Music psychology, for the most part with little

historical ambition, distinguishes musical time perception from clock time with terms such as "flow experience".[16] And such a flow experience would be brought to an abrupt end by a glance at the clock. The observations and reflections on musical time outlined here have in common that they firmly maintain the specificity of musical time.

For soundfile listening, listening to musical works plays only a subordinate role. Playlists have taken the place of musical works in soundfile listening.[17] Unlike a musical work, a playlist is an open, non-finished, serial form which consists in stringing together various pieces that are less stand-alone works and more attractive due to their suitability for inclusion in a playlist. For the time experience of soundfile listening the objectified musical time in the work is far less significant than the temporality of the playlist. The playlist is not determined solely by music, but besides its management by streaming services the playlist's existence relies on media. Which in the case of the soundfile playlist is the networked computer and its technical media time.

Listening and (Ahistorical) Media Time

A critique of historical time is not only found in music historiography, but also in media archaeology. There, media technologies are understood, rather cunningly, as "time machines".[18] But these are not those imaginary machines that make it possible to travel to present times in the past, for which the discipline of history was and is responsible. The machines referred to here bring forth and organise their very own, specific, and new form of time. Media time like this cannot be reduced to historical time. Thus, researching media time is not a matter for media history, but for media archaeology. Media history analyses the development of new media and old media that become obsolete, whereas media archaeology analyses both the manner in which media become operative *in* time and poses the question as to an own time of the media, a genuine media time, a time that entails media and that is brought forth *through* media. It is supposed that the attitude of this media time will be "invariant" toward historical time.[19] This is substantiated with reference to a seventeenth-century music automaton: "The mechanical system makes sounds we hear today that are the same as 300 years ago."[20] The media archaeological point here is that "we" certainly hear the sounds of the automaton today differently than people did 300 years ago because cultural and historical circumstances have made "our" ears different. Nevertheless, the music automaton does produce sounds today with the same or a very similar temporal structure as it did 300 years ago. Here Wolfgang Ernst speaks of "re-presencing"[21] or an "ahistorical functional re-enactment".[22] It is expected that re-presencing and functional re-enactment will

not change in relation to historical time. Gundula Kreuzer has now pointed out that “media archaeology’s emphasis on the presentness of technical artefacts resonates intriguingly with music historiography”.[23] Both musical time and the media’s own time would open up more latitude towards historical time. Kreuzer has identified a potential for music historiography, which cancels out the duality of musical works as historically timeless on the one hand and as cultural-historical documents on the other by referencing the own time of sound objects — here Kreutzer is referring to musical instruments.

The time of sound objects and media resonates again and again with musical time. So far, this has been explored less in connection with listening to music and more in connection with the time of making and producing music.[24] But to what extent does an implicit media time become explicit in music listening? When media time and music listening time synchronise, resonate, or modulate each other, music listening means less “aesthetic identification” (Eggebrecht) with the musical time of the work. Instead, the specific time experience of listening to music will be shaped by the media of listening to music, by the time of its media infrastructure. In the case of soundfile listening, it is an infrastructure which does not allow anything to be past and gone (everything is stored) and which is nevertheless strongly oriented on the future; a future, however, that is seldom open but brought to mind through predictions and forecasts based on statistics.

Soundfile Listening and the Management of Listening

In contemporary listening culture soundfile listening continually gains in importance. This is apparent when one looks at the figures: in its report *Music Listening 2019: A Look at How Recorded Music Is Enjoyed Around the World,* the International Federation of the Phonographic Industry (IFPI), the organisation that represents the recorded music industry worldwide, 89% of the respondents said they listen to music via “on-demand streaming” services.[25] And rising. According to the Federal Music Industry Association of Germany, in the first half of 2020 audio streaming services accounted for two thirds of the sales of recorded music in Germany.[26] And rising. Spotify, a market leader for music and audio streaming services, in the fourth quarter of 2020 had 345 million active users (of which 155 million are subscribers) and had a turnover (in just three months!) of 2.17 billion Euro. As users and turnover are rapidly growing, the loss of 125 million Euro in the same quarter did not lead to any fall in Spotify’s shares.[27] Since its foundation in 2006, the company has incurred massive losses in practically every quarter. Spotify’s turnover from subscriptions is nearly seven times more than its earnings from advertising. However, the turnover from

advertising has risen more than from subscriptions.[28] In addition, the percentual profit share from advertising revenue must be considerably higher than from the subscriptions revenue because two thirds of the subscriptions revenue goes to copyright holders and administrators. The streaming boom shows no sign of abating any time soon: in its report *Music in the Air* (2020), the investment bank Goldman Sachs estimates that in 2030 1.2 billion people will be paying for music streaming; in 2019 it was only 341 million people.[29] The projected growth relies primarily on emerging markets and less on established markets.

In the context of this boom, which has lasted some years now and looks to continue in the future (at least according to Goldman Sachs), streaming services have developed a huge interest in listening. With this, they are carrying on an industrial tradition, which appeared for instance in the U.S. telephone industry in the early twentieth century and defined "hearing as an economic problem".[30] In the case of the streaming services, the management of listening not only includes the physiology of hearing and psychoacoustics as the older audio technologies did, but to a greater extent the processes of segmentation, pattern recognition, cognition, learning, memory, and expectation[31] and, as has been ascertained in the context of a political economy of streaming, also the transformation of listening into a strange form of unpaid labour: Martin Scherzinger revisits a widespread critical diagnosis, particularly of the social media, and subjects it to further critique.[32] According to this diagnosis, users of social media, as well as of streaming services, are no longer envisaged as customers, but as products, because through using the services and platforms data is collected that is then monetised.[33] Scherzinger points out, however, that tracking the listening behaviour of listeners does not make them products per se, but at most the data this produces. The listeners are not products. Instead, they are actually working for the services as it were, by producing data that is the raw material for data profiles.[34] The relationship between services and listeners is therefore ambivalent. On the one hand it is a relationship between service provider and customer. Then the provider delivers music to the listeners that they want to hear. On the other hand listening is organised here as a kind of unpaid and affective labour; almost unnoticed, listeners are integrated "into an affective circuit of *dis*-alienated labour".[35]

Past Future — Future as a Reference to the Past[36]

That which will be listened to as soundfiles originated in the past. The past becomes concrete in the catalogues of the streaming services, which at present each contain around 60 million audio tracks. The catalogue is the sine qua non of what can be heard. In soundfile listening there will be nothing heard that is not in the catalogue. In this sense the future of

soundfile listening has always been past already. The British cultural theorist Mark Fisher, in his book *Ghosts of My Life: Writings on Depression, Hauntology, and Lost Futures*, described this kind of past future as characteristic of popular music and digital recollection in the twenty-first century. However, here it is not only the future that is lost, but loss itself: "In conditions of digital recall, loss is itself lost."[37] Everything is stored in digital archives and catalogues and can be re-accessed any time. What is past is then not simply past, but returns in the future like a revenant, says Fisher.

Although what is heard in soundfile listening comes from the past, soundfile listening itself is largely oriented on the future. The question "What comes next?" seems to dog soundfile listeners. Jimmy Iovine, music manager, producer, and powerfully eloquent co-founder of the headphones company Beats by Dre, which in 2014 was sold to Apple for three billion U.S. dollars, reduced this to the following formula: "What song comes next is as important as what song is playing now". This was not always the case, but it is strongly connected to what the relevant media and musicological literature on streaming services refer to as "the curatorial turn".[38] In the early years, that is, until around 2012/13, streaming services concentrated mainly on "access", on offering listeners an increasingly large catalogue of music tracks. In those years this strategy was complemented (the use of the word "turn" was somewhat overly dramatic) by another strategy that relied on personal recommendation. The recommendation is frequently presented in the form of personalised playlists by which means a listener can discover new music. By supplementing "access" with "recommendation" listening can be more strongly directed to the future, to the "next song".

From this point onward things are found that nobody was actually looking for. In this mode something new may be discovered that the listener possibly regards as an important fortuitous find, a serendipitous event. One thing is certain, however — as mentioned above — that that which will be heard next, in the future, originated in the past. Naturally, this is always the case with recorded and produced music. Admittedly, with soundfile listening, the catalogue from which the music heard in the future comes has reached an unprecedented size. What is also certain is that the next song is not a chance find. Although the listener had not been looking for what is found next, it is actually the result of an algorithmically generated, personalised recommendation. Thus, the next song that is heard will probably be found desirable, although the listener wasn't looking for it. Because nothing specific is being sought, the search does not end. In this way the listeners are disburdened in two ways, from making any effort and from boredom. The listeners are literally spoon-fed new music. The search then remains a search without any object being sought, without an object which if

found would end the search. Streaming services are not interested in that at all. This “open” listener experience takes the form of a personalised playlist.

With regard to his notorious structural listener, Theodor W. Adorno stated that they hear at once “past, present, and future moments”.[39] However, Adorno’s structural listener must hear musical works as “objectively structured things and meaningful in themselves”.[40] According to this, structural listening draws on memory and anticipation, on memory and anticipation within the wholeness of a unique musical work. Listening as the re-enactment of a sonata form, for example. Complete works — whether the major works of classic and Romantic music or the concept albums of popular music — are certainly offered by streaming services and listened to. However, then musical time is mostly decoupled from the technological time of digital media. In contrast to such works playlists, which represent one aspect of soundfile listening as updated linear paths through the virtual holdings in the catalogue, are open or rather unclosed structures, which do not exist autonomously of their media infrastructure.

The past future of soundfile listening is on the one hand determined by the audio tracks stored in the catalogue, and on the other by the question of which track comes next.

Present Future: Predictions and Self-Optimisations

In addition to the past future, soundfile listening is also characterised by a present future. This future is also not open. It is already re-presented by predictions and self-optimisations.

A method by means of which the future is captured and re-presented in soundfile listening is predictive analytics. This statistical method is used in the Internet economy to make predictions on the basis of Big Data. In the case of soundfile listening, this means that what from the past will actually be listened to is recommended by statistical forecasting techniques. These techniques are fed with data that originate from the recording and quantification of listener behaviour. In order to know what will be wanted in the future, data is collected in the present, which is then used to refine taste profiles, and it is on this basis that the next song will be recommended. To create playlists, streaming services use a variety of algorithmic techniques:[41] use is made of techniques that are based on algorithmic analysis of the music’s audio data, which is then classified with regard to qualities such as “danceability”, “energy”, or “liveness”. In addition, written texts on the Net are analysed and a kind of “word cloud” is created for each track. Lastly, collaborative filtering is used in which a user’s behaviour is matched with that of other users. These three techniques enable identification of similarities between different tracks regarding listener behaviour, audio data, and the terms

assigned to a track. On the basis of these similarities, predictions are made as to which new tracks or tracks as yet unknown to the listener they will probably like as their next songs.

Predictions bring the future into the present, the future becomes a prolongation or "forward projection of the present":[42] "The techniques of predictive analytics and thus the entry of forecasting into our everyday environments make possible futures operable — and thus assured".[43] Also, in soundfile listening the aim of predictive analytics is that in the future what is desired will take place and what is not wanted will stay away. It is about the increase and decrease of probabilities, about determinations of normalities and deviations. This is a further stark, contingency-minimising intervention in the future. The music philosopher Robin James has remarked that in the late twentieth and the early twenty-first century, probability statistics have changed from being "a mere tool for describing things" to a "fundamental structure of reality and knowledge"[44] — a reality of distribution of norms and deviations, a reality, we may add, that also applies to soundfile listening.

Besides the re-presentation of the future through predictions based on predictive analytics, in soundfile listening the future is laid out as optimised. Numerous studies on the subjects of streaming and soundfiles, which are explicitly or implicitly indebted to the analysis of power by French philosopher and historian Michel Foucault, have pointed out that here the future is drawn up as a strongly optimised one, a future of self-optimisation and efficient self-control.[45] Listening to music then becomes a practise of self-optimisation in which the listening subjects exercise productivity and efficiency, resilience and fitness, well-being and care of the self. Such self-optimisation can be oriented on certain normed and idealised daily routines and imply "chrononormative effects" for a conception of "the good life"[46]: "wake up in the morning in a good mood and get ready for work, stay focused and productive in the afternoon, relax in the evening with family or friends" and organise "life in terms of achieving maximum productivity".[47] Playlists then contribute to organising such a daily routine with the aid of which the subject can optimise his/her productivity.

Journalist Liz Pelly has also described a soundfile subject who is oriented towards self-optimisation. She has supposedly realised that the biggest streaming service at the moment is a "mood-boosting platform", which will give the subject a kind of mood improvement on an affective level: "Spotify evidently did not want me to sit with my sorrow; it wanted my mood to improve. It wanted me to be happy."[48] Pelly bases this observation empirically on various Spotify playlists, which are devoted to a certain mood, activity, or situation, and which Pelly believes she has reason to think are geared towards self-optimisation because, for example,

they seek to turn paralysing sorrow into vigorous determination in order, ultimately, to restore the lost capability for performance.

For Pelly, the decisive factor is the subtleness of the self-optimisation orchestrated by sound, which interacts with the targeted management of mood by music streaming to form a sort of background experience. Pelly quotes the former director of Spotify's department for global business growth: "We love to be a background experience. You're competing for consumer attention. Everyone is fighting for the foreground. We have the ability to fight for the background. And really no one is there. You're doing your email, you're doing your social network, etcetera".[49]

In the scenario described by Pelly, the soundfile subject in her/his temporality is oriented on an ostensibly better, more productive, and optimal future. Listening to music or buying headphones can be construed as an investment in the future. Blogger Melina Royer reports on her purchase of noise-cancelling headphones: "Yes, they really are expensive. I thought about whether I should invest all that money for a long time. But I haven't regretted it for a second. (If you're self-employed, it's tax-deductible anyway)".[50]

Although from different directions, Liz Pelly and Melina Royer both describe the future orientation of soundfile listening as the transformation of music into a utilitarian tool for productivity. As such, music comprises a promise of optimisation; the promise of making listeners more productive and efficient. Utilisation of music in this way has a long history, which includes work songs and sea shanties, utility music, Muzak, and the BBC's *Music While You Work* programme (1940–1967). Unlike these forms of music, which are intended to control and manage subjects quasi from outside, soundfile subjects increasingly control and optimise themselves for their futures.

Uncertain Future

A third form of the future of soundfile listening may interact with what media theorists have called the indeterminableness especially of digital media. *The* purpose of the universal machine that is the computer should then either remain indeterminable or determination postponed. Unlike the "uncertain usability of the digital medium",[51] the purpose of sound technology like that of the nineteenth century mechanical phonograph, which was built like a kind of objectivised ear,[52] may be ambiguous but it was not uncertain.

One only has to think of Thomas Alva Edison's newspaper article "The Phonograph and Its Future" of 1878, in which Edison made predictions for the future of this machine, which had only just been invented: as a dictation machine, for reading to the blind, and as a pedagogical tool for practising rhetoric. As a machine for listening to music, Edison foresaw only a minor role for the phonograph.[53] Of course, such provisions regarding the purpose of sound technologies do not preclude changes of use in the future at all. In the case of DJ culture, on the basis of a change of use or rather a redefinition of purpose has enabled the development of a new musical practise. The digital simulation of a phonograph or record player, however, would rather be an indication of the uncertain usability of the digital medium. A machine that is able to simulate all other machines.

In contrast to mechanical media, says Erich Hörl, with cybernetic, digital machines there will be "a technological end of function",[54] an end of teleology and anthropocentrism will be reached. Now, the apps and programmes for music listening that feature in this essay are certainly neither purposeless nor functionless. Their purpose — at least for the streaming services — lies in the algorithmic management and capitalisation of music listening, the data on the behaviour of users and groups generated by customers listening to music, the development of a model that can predict human behaviour so that the placement of advertising is carefully targeted and, finally, enhancement of the company's attractiveness to investors. Thus the streaming services bring various markets together: the music market, the advertising market, and the financial market.[55] If soundfile listening pursues this purpose, then the future as well as the uncertain usability and the purported purposelessness, futility, and functionlessness of its digital infrastructure will remain closed, except for possible dysfunctions of "an eternal beta version and perpetual updates" in digital cultures.[56] Critical practises targeting an opening up of the future of soundfile listening need not necessarily regress into an "anti-playlist logic" which sees "buying records" as the solution.[57] They could also espouse "algorithms-awareness listening"[58] or adopt "listening back" in which algorithmic data collection is rendered audible.[59] Then the willingness to engage with acoustically open situations, to encounter non-personalised surprises when listening to soundfiles, would not necessarily decrease.

Translated from the German by Gloria Custance

Notes

[1] Peter Gay, *The Naked Heart* (Bourgeois Experience, Vol. 4), (New York: W.W. Norton, 1995); Christian Thorau and Hansjakob Ziemer, "The Art of Listening and Its Histories: An Introduction", in *The Oxford Handbook of Music Listening in the 19th and 20th Centuries*, eds. Christian Thorau and Hansjakob Ziemer (Oxford: Oxford University Press, 2019) 1–36.
[2] Karin Bijsterveld and José van Dijck, *Sound Souvenirs: Audio Technologies, Memory, and Cultural Practises* (Amsterdam: Amsterdam University Press, 2009); David W. Samuels et al., "Soundscapes: Toward a Sounded Anthropology", *Annual Review of Anthropology* 39 (2010): 329–345.
[3] These four points are addressed in more depth in Jens Gerrit Papenburg, "Soundfile: Kultur und Ästhetik einer Hörtechnologie", *POP. Kultur & Kritik* 2 (2013): 140–155.
[4] Andreas Lenander Ægidius, "Music radio as a format remediated for stream-based music use", in *Music Radio: Building Communities, Mediating Genres,* eds. Morten Michelsen et al. (London: Bloomsbury Academic, 2019) 291–310.
[5] Kristoffer Cornils, "Zur Geschichte der Playlist", in *Listen! Das Neue Alphabet,* vol. 2, eds. Lina Brion and Detlef Diederichsen (Leipzig: Spector Books, 2021) 18–36.
[6] Christian Elster, *Pop-Musik sammeln: Zehn ethnographische Tracks zwischen Plattenladen und Streamingportal* (Bielefeld: Transcript Verlag, 2020).
[7] Martin Scherzinger, "Temporalities", in *The Oxford Handbook of Critical Concepts in Music Theory*, eds. Alexander Rehding and Steven Rings (Oxford: Oxford University Press, 2019) 234–270; Rolf Großmann, "Rhythmus", in *Handbuch Sound: Geschichte, Begriffe, Ansätze*, eds. Daniel Morat and Hansjacob Ziemer (Stuttgart: J.B. Metzler, 2018) 71–74; Julian Caskel, *Die Theorie des Rhythmus* (Bielefeld: Transcript Verlag, 2020).
[8] Hans Heinrich Eggebrecht, *Musik im Abendland: Prozesse und Stationen vom Mittelalter bis zur Gegenwart*, Munich: Piper Taschenbuch, 7ed, 1996) 552.
[9] ibid.
[10] Richard Klein, *Musikphilosophie zur Einführung* (Hamburg: Junius Verlag, 2014) 157.
[11] Alexander Rehding, *Music and Monumentality: Commemoration and Wonderment in Nineteenth Century Germany* (Oxford: Oxford University Press, 2009) 9.
[12] Klein, *Musikphilosophie,* 2014, 157.
[13] Eggebrecht, *Musik im Abendland*, 1996, 552.
[14] Ibid.
[15] Günther Stern, "Philosophische Untersuchungen über musikalische Situationen" [1930/1931], in *Günther Anders: Musikphilosophische Schriften*, ed. Reinhard Ellensohn, (Munich: C.H. Beck, 2017) 15–176; here 44.
[16] With reference to Mihaly Csikszentmihalyi, *Flow. The Psychology of Optimal Experience* (New York: Harper Collins e-books, n. d. [1990]) 108–113.
[17] In a prospectus sent to the U.S. Securities and Exchange Commission in preparation for stock exchange listing in 2018, Spotify stated that of the monthly total of music listened to in December 2017 around 17% was from algorithm-generated personalised playlists, ca. 15% from featured playlists, and around 36% from user-generated playlists. Thus more than two thirds of the music heard was organised in playlists; see Spotify Technology S. A., *Prospectus Filed with the Securities and Exchange Commission,* 2018, https://www.sec.gov/Archives/edgar/data/1639920/000119312518092759/d494294df1a.htm, last accessed 16.03.2021.
[18] Wolfgang Ernst, *Sonic Time Machines: Explicit Sound, Sirenic Voices, and Implicit Sonicity* (Amsterdam: Amsterdam University Press, 2016).
[19] Ibid., 91.
[20] Wolfgang Ernst, *Im Medium erklingt die Zeit* (Berlin: Kulturverlag Kadmos, 2015) 205.
[21] Ernst, *Sonic Time Machines*, 2016, 95.
[22] Wolfgang Ernst, *Digital Memory and the Archive* (Minneapolis, MN: University of Minnesota Press, 2013) 175.
[23] Gundula Kreuzer, "Kittler's Wagner and Beyond", *Journal of the American Musicological Society* 70, 1 (2017) 232.
[24] Ernst (*Im Medium erklingt die Zeit*, 2015, 81) mentions Elvis Presley's famous vocal style as a (media) musical practise, which was adapted to the characteristic tape recorder echo of various Rock'n'Roll productions. In this echo a tape recorder delays an input signal in the millisecond range. Mark Butler (*Playing with Something that Runs: Technology, Improvisation, and Composition in DJ and Laptop Performance* (Oxford: Oxford University Press, 2014) has tried out the integration of media

time in musical time in the practises of making music in electronic dance music, which become differentiated and re-organise in the process of engaging with and the friction with autonomously running technologies such as record players, sequencers, and also digital audio workstations. Jens Schröter ("De- und Resychronisationsketten: Die Schicksale des Plattenspielers", in *Kulturtechniken der Synchronisation*, eds. Christian Kassung and Thomas Macho (Paderborn: Wilhelm Fink, 2013) 367–385) has shown how in musical practises in connection with record players different forms of synchronisation or de- and resynchronisation have emerged. The media technology time of the record player and the history of its standardisation were not only audible interference in musical time, but also in the context of the "modernist aesthetics" of John Cage's *Imaginary Landscape No 1* (1939) or Boyd Rice's *Pagan Music* (Graybeat 1978) as well as the DJ culture mentioned above. In all these cases the technological media time, which according to Ernst is similar to sound and implicitly sonic due to its processing and operation by media (*Sonic Time Machines*, 2016, 90), becomes a component of explicitly musical sounds.

[25] International Federation of Phonographic Industry, *Music Listening 2019: A Look at How Recorded Music is Enjoyed Around the World*, 2019, https://www.ifpi.org/ifpi-releases-music-listening-2019/, last accessed: 16.03.2021.

[26] Bundesverband Musikindustrie, *Musikindustrie in Zahlen 2019*, 2020, https://www.musikindustrie.de/fileadmin/bvmi/upload/06_Publikationen/MiZ_Jahrbuch/2019/Musikindustrie_in_Zahlen_2019.pdf, last accessed: 16.03.2021.

[27] Benjamin Fischer, "Spotify kündigt Hifi-Abo und Start in 85 neuen Märkten an", *Frankfurter Allgemeine Zeitung*, 22.02.2021, https://www.faz.net/aktuell/wirtschaft/digitec/spotify-expandiert-neue-maerkte-und-ein-obama-podcast-17211416.html, last accessed: 16.03.2021.

[28] At least in the first quarter of 2018, see Cherie Hu, "Spotify vs. Pandora: Which Radio Competitor is Winning at the Ad-Supported Game", *Billboard*, 01.06.2018, https://assets.billboard.com/articles/business/8458166/spotify-pandora-ad-supported-streaming-analysis, last accessed: 16.03.2021.

[29] Goldman Sachs, *Music in the Air*, 2020, https://www.goldmansachs.com/insights/pages/infographics/music-in-the-air-2020/report.pdf, last accessed: 16.03.2021.

[30] Jonathan Sterne, *MP3: The Meaning of a Format* (Durham, NC: Duke University Press, 2012) 45.

[31] See the expanded model of listening in Tristan Jehan, *Making Music by Listening* (Cambridge, MA: Massachusetts Institute of Technology, PhD thesis, 2005) 36. Jehan is a co-founder of the company The Echo Nest, which was bought by Spotify in 2014. After this acquisition, the streaming service increasingly changed its business model from "access" to "recommendation".

[32] Martin Scherzinger, "The Political Economy of Streaming", in *The Cambridge Companion to Music in Digital Culture*, eds. David Trippett, Monique M. Ingalls,and Nicholas Cook (Cambridge: Cambridge University Press, 2019) 274–297.

[33] The phrase "If you're not paying for the product, then you are the product" was further popularised by the Netflix docudrama *The Social Dilemma* (directed by Jeff Orlowski, USA, 2020).

[34] Scherzinger, *Political Economy of Streaming*, 2019, 288.

[35] Ibid. 292; the emphasis is Scherzinger's.

[36] In my discussion of the three future forms of soundfile listening I take over and develop reflections included in the following article: Jens Gerrit Papenburg, "Bewirtschaftung der Zukunft: Musikhören durch Apps, Kopfhörer, Smartphones", in Deutsche Telekom AG, *Telekom Electronic Beats* (Berlin: Blumenbar, 2021) 92–99.

[37] Mark Fisher, *Ghosts of My Life: Writings on Depression, Hauntology, and Lost Futures* (Winchester: Zero Books, 2014) Chp. 1, Lost Futures.

[38] Maria Eriksson et al., *Spotify Teardown: Inside the Black Box of Streaming Music* (Cambridge, MA: MIT Press, 2019) 61; see also Eric Drott, "Why the Next Song Matters: Streaming, Recommendation, Scarcity", *Twentieth Century Music* 15, 3 (2018): 325–357.

[39] Theodor W. Adorno, "Types of Musical Conduct", in *Introduction to the Sociology of Music* (New York: Continuum, 1976), pp.1–20, here: 4.

[40] Ibid., 3.

[41] The three techniques mentioned here are found in Sophia Ciocca, "How Does Spotify Know You So Well?", *Medium*, 10.10.2017, https://medium.com/s/story/spotifys-discover-weekly-how-machine-learning-finds-your-new-music-19a41ab76efe, last accessed: 16.03.2021.

[42] Irina Kaldrack, "Digitale Kulturen zwischen ewigem Update und sta(tis)ischer Zukunft", *Design* 38 (2018): 96–100.

[43] Ibid., 97.
[44] Robin James: *The Sonic Episteme: Acoustic Resonance, Neoliberalism, and Biopolitics* (Durham, NC: Duke University Press, 2019) 1.
[45] See Eriksson, *Spotify Teardown*, 2019; Eric Drott, "Why the Next Song Matters: Streaming, Recommendation, Scarcity", in *Twentieth-Century Music* 15, 3 (2018): 325–357; Maximilian Haberer, "Versuch über Spotify, oder: Musikstreaming als Arbeit am Subjekt", in *Wissen im Klang: Neue Wege der Musikästhetik*, eds. José Gálvez, Jonas Reichert, and Elizaveta Willert (Bielefeld: Transcript, 2020) 145–162.
[46] Here Maria Eriksson and Anna Johansson refer to Elizabeth Freeman's concept of chrononormativity: Maria Eriksson and Anna Johansson, "'Keep Smiling': Time, Functionality and Intimacy in Spotify's Featured Playlists", *Cultural Analysis* 16, 1 (2017): 67–82.
[47] Jasmine Guffond and Maria Eriksson, "Zerlegen, um zu durchschauen", in *Listen! Das Neue Alphabet* vol. 2, eds. Lina Brion and Detlef Diederichsen (Leipzig: Spector Books, 2021) 11.
[48] Liz Pelly, "Big Mood Machine", in *The Baffler*, 10.06.2019, https://thebaffler.com/downstream/big-mood-machine-pelly, last accessed 16.03.2021; see also Maria Eriksson et al., "Soundtracking the Lives of Happy Subjects", in Eriksson et al., *Spotify Teardown*, 2019, 121–128.
[49] Jorge Espinel quoted by Pelly, *Big Mood Machine*, 2019.
[50] Melina Royer, "Endlich Ruhe dank Noise Cancelling!", in *Vanilla Mind*, https://vanilla-mind.de/endlich-ruhe/, last accessed 16.03.2021.
[51] Georg Christoph Tholen, *Die Zäsur der Medien: Kulturphilosophische Konturen* (Frankfurt am Main: Suhrkamp, 2002) 19f.
[52] Matthias Rieger, *Helmholtz Musicus: Die Objektivierung der Musik im 19. Jahrhundert durch Helmholtz' Lehre von den Tonempfindungen* (Darmstadt: WBG Academic, 2006) 67–82.
[53] Thomas A. Edison, "The Phonograph and Its Future" [1878], in *Music, Sound, and Technology in America: A Documentary History of Early Phonograph, Cinema, and Radio*, eds. Tony Grajeda, Mark Katz, and Timothy Taylor (Durham, NC: Duke University Press, 2012) 29–36.
[54] Erich Hörl, "Die Ökologisierung des Denkens", *Zeitschrift für Medienwissenschaft* 8, 14/1 (2016): 34.
[55] See Robert Prey, "Locating Power in Platformization: Music Streaming Playlists and Curatorial Power", *Social Media + Society* 6, 2 (2020): 1–11; see also Eriksson, *Spotify Teardown*, 2019, 157–172.
[56] Kaldrack, *Digitale Kulturen*, 2018, 97.
[57] Liz Pelly, "Alle Playlists bewerben irgendwas", in *Listen! Das Neue Alphabet,* vol. 2, eds. Lina Brion and Detlef Diederichsen (Leipzig: Spector Books, 2021) 51–66, here 61.
[58] Haberer, *Versuch über Spotify*, 2020, 154.
[59] See Maria Eriksson and Jasmine Guffond, "Listening Back", in *Listen! Das Neue Alphabet,* vol. 2, eds. Lina Brion and Detlef Diederichsen (Leipzig: Spector Books, 2021) 67–75.