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BOOK REVIEW

# Inscriptive instruments: emergent sonic technologies from the analog to the digital

**Sonic writing: technologies of material, symbolic, and signal inscriptions** by Thor Magnusson, New York, Bloomsbury Academic, 2019, 304 pp., $33.17 (paperback), ISBN 978-1501313868.

In recent years the "sonic" emerged as an important unit of critical analysis in the ever-broadening field of sound studies. Sonicity offers an expansive role for sound by placing it in proximity to a vast area of cultural, social, political, and philosophical issues that cross disciplinary boundaries challenging how we categorise and think about music and sound (Voegelin 2014; Schulze 2018; Cox 2018; James 2019). Thor Magnusson's *Sonic Writing* offers an important and timely intervention into thinking the sonic within the matrixial relations between humans, instruments, and technology. *Sonic Writing* uncovers how our contemporary digital technologies trace their genealogies to earlier instrumentation and media. Magnusson takes us on an engaging historical tour of instrument design, expansive notational practices, and recording. These practices can be thought of as forms of sonic writing where instruments become inscriptive devices and notation and recording become that which is inscribed. The metaphor is stretched though by music's move into digital frames of reference. Magnusson argues that music, as a technology of instrumentation, is connected to the development of the human brain and emerges alongside tool usage and musical semiotic systems. Within this development, the musical instrument becomes "concretised music theory" (5) operating as an epistemic tool that develops human memory, sense of time, rhythmicity, and more. The key to this epistemological development is the transmission of memory trans-generationally between people that shapes how we think with and through technologies and that develop both outward and inward experiences. Magnusson, following Christopher Small's work on "musicking", argues that sonic technologies are a part of the active vital process of becoming a human in the world with other humans (Small 1998). This adds a critical element to the conversation around music making and human being in relation to instruments and notation.

In Part One, Magnusson charts the development of instruments by exploring the differing connections and nuances that emerge between the instrument and the tool, attending to the epistemic and ontological consequences of these distinctions. Central to these distinctions is music, broadly conceptualised, and its modulation between analogue and digital. Beginning in the realm of the mythological and moving quickly to the present (with a multitude of stops in between) Magnusson argues how musical instruments at the beginning of our cultural emergence played a pivotal role in musical and social development by acting as social agents that "contain music, theory, and culture" (31). The physical haptics of the analog give way to digital physical expressions and arrangements (ergodynamics) that require new expressive modes. This is a dynamic change in qualia: one does not require much force to depress a key and make the sound of the drum with a MIDI interface, unlike actually striking a skin with a stick with force. We might also note the difference in instrumentation where a keyboard makes a drum sound as a form of remediation. The interface, so theoretically critical to the

present moment, is a key element that differentiates electronic and digital instruments from acoustic ones: digital instruments have an interface, whereas acoustic instruments are an interface (35). These technological differentiations allow us to consider the separation of techne from the episteme, or more plainly, theory from practice.

Moving to a consideration of the scientific revolutions' epistemological and technological impact on humans, Magnusson discusses how scientific and music instrumentation "serve as extensions of our bodies and amplifier of our senses" (48). This McLuhanist insight supports an argument that technology is the key transformative element humans interact with to "extend our minds" (McLuhan 2010). Technology, whether a tool or an instrument, positions humans in the interactive assemblage between instruments, thinking, and the machinic, in that Magnusson calls musical organics. Magnusson proposes an organological approach that expands our understanding of musical instruments as epistemic technological tools and pushes our humanity into new realms by producing new ways of knowing. This is akin to the creation of a tool and its usage. Musical instruments are designed and played, which is an ergodynamic process that facilitates the explorative and experimental interface between the world and ourselves. That is, the musical instrument actively produces a subject through usage. We may expand on Magnusson's insight and argue that instrumentation and playing is a form of world-making.

In the middle half of the book, Magnusson considers instrumentation in relation to its symbolic and the signal transcriptions. The challenge for the symbolic concept of notation is how one represents what is unpresentable. Printing allows for the sharing of cultural memory and a broad dissemination of interpretation. Magnusson's analysis of the printing press and music is particularly engaging as he competently explains and joins aspects of notation, oral troubadour traditions, and the search for faithfulness to the intentions of the composer, which are all challenged by the fact that music and sound always slips away from standardisation even as standardisation results in norms and expectations that impact the social practice of music. Standardisations are challenged further by graphic scores, open notation, new media, and improvisation. Neither written transcription or recording can possibly capture precisely what is happening to the instrument and how it should sound. Rather than an exact copy, printed music is subject to interpretation and hence becomes a technology of memory. As instrumentation morphs from the analog to the digital, and as the interface moves from the instrument to the machinic, composition becomes an assemblage of materials that may be thought of as non-musical: hardware, code, AI, standards and protocols are now part of the materiality of composition. When notes become electrical signals, as in computer-generated sound or modular synthesiser's controlled voltage (CV) protocols, the heterodoxy of musical notation erodes: how does one account for voltage, knob movements, or the speeding up and slowing down of tape? Rather than notation, music is now part of systems design, as demonstrated by MIDI and generative music.

Returning to instruments, the final part of the book moves into the realm of the digital. The final decades of the 20$^{th}$ Century were largely about the remediation of analog media into digital realms, where simulation of the analog was the goal of instrumentation. For example, the functions and look of the recording studio with faders, knobs and levels were mimicked in software environments like Ableton Live or Logic. One can buy plugins that imitate the sound of equalisers, compressors, and tape simulators from famous studios like Abbey Road. However, we now have emerging environments of deep learning, machine listening, artificial intelligence, and big data. How do these impact composition, instrumentation, and notation? Google Brain has a machine learning developer for the creative process that "develop[s] new deep learning and reinforcement learning algorithms for generating songs, images, drawings, and other materials. But it's also an exploration in building smart tools and interfaces that allow artists and musicians to extend their processes using these models" (https://magenta.tensorflow.org/). Magenta is not

simply a way of generating art but is an extension of our being. Technology and creativity have become platforms "for how we act, create, share, collaborate, and communicate through our new networked computational technologies" (176). If we follow Magnusson's arguments about inscription, embodiment, and epistemology, then the stakes may be rather high when the cultural trans-generational transmission is digitised. But this part of Magnusson's analysis seems undeveloped. It may be that the technology has not been established enough for Magnusson to truly grapple with this aspect of instrumentation and notation.

Magnusson's grasp of the historical development of a broad spectrum of instruments is fascinating and offers an important contribution to the understanding of instrumentation and digitisation. The writing is clear and he frequently signposts his arguments throughout the book, circling back to restate arguments, refine his thesis, and tell the reader what he's done and where he is going next. The arguments are grounded in deep historical analysis and explained in a way that foregrounds the story. At its best, *Sonic Writing* provides a clear pathway through complex histories, and Magnusson successfully guides us towards questions about what is happening in the era of platformed creativity. The book offers a redefinition of practices and epistemologies that questions what it means to be creative, what it means to compose, and what it means to write music. The myriad ways of writing in the realm of the digital, from live coding, computational thinking, and interactivity are reshaping reality in the realm of music and sound studies. Add to this new forms of instrumentality and we can begin to discern an emergent paradigm in creativity where image, music, text are blending together in ways that force us to rethink the organological, the ergodynamic, as well as the production, distribution, and reception of musical works as code, systems, and process.

## Notes on contributor

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