Philippe Manoury: Les neurones enchantés. Le cerveau et la musique (2014)

Les neurones enchantés is a three-way conversation about music and its perception by the brain, featuring the neurobiologist Jean-Pierre Changeux and the composers Pierre Boulez and Philippe Manoury. Changeux sets a general perspective of neuroscientific attempts to grasp musical creation: can recent advances in the understanding of brain function enhance our understanding of the creative process, particularly when it comes to masterpieces such as those composed by Boulez?

But, in the first place, how to find common ground between disciplines as far apart as neurobiology and musical composition? The conversation is first and foremost an epistemological effort, guided throughout by Changeux. Having studied composition with André Jolivet, Changeux is able to discuss music and its creation from the inside, but he strives for objective characterisation, drawing mainly on the tradition of music as a science that dates back to Antiquity. In response, the two composers describe their work and clarify it as much as possible, often resisting Changeux's reductionist, schematic approach and asserting contemporary compositional perspectives against his highly classical conceptions. In this trialogue, Manoury frequently brings an expert yet external viewpoint on Boulez's music, thus facilitating and enriching the exchanges.

The conversations are organized into seven chapters with rather broad themes, each containing a number of sub-themes. At Changeux's lead, the first two chapters, "What is Music?" and "The Paradoxes of 'Beauty' and the Rules of Art", attempt to characterize music in classical fashion, starting from Jean-Jacques Rousseau's definition and proceeding in mainly aesthetic terms. Boulez transposes these issues to the world of contemporary composition, discussing the genesis of works such as *Le Marteau sans maître* and *Répons.* Questions from Manoury prompt him to clarify.

In the third chapter, "From Ear to Brain: The Physiology of Music", Changeux and Boulez agree on viewing musical perception as a form of learning, and musical listening as a mental reconstruction. The fourth chapter gets to the heart of the book's subject, drawing a parallel between the epigenetic evolution of the human brain, which in Changeux's view follows a Darwinian variation-selection model, and the process of composition as described by Boulez, involving, in his case, an initial abundance of ideas followed by a synthesis of disparate elements.

The fifth chapter considers the balance between the conscious and the unconscious in musical invention. Where Changeux describes neurological experiments that have identified levels of consciousness in circuits, Boulez locates the unconscious in

two areas: accidents of writing, which the composer commits without realising it beforehand, and intrusions of the past, in which material stored in the long-term memory returns transformed.

The sixth chapter, “Musical Creation and Scientific Creation”, examines transdisciplinary influences, such as the importance of Paul Klee for Boulez and probabilistic models for Manoury (and Changeux). The concept of the model turns out to mean something quite different for musicians than for scientists, and even for different composers (compare Xenakis to Boulez).

The seventh and final chapter, “Learning Music”, is largely given over to remarks by Changeux about the development of children’s brains through adolescence, and its correlation with the acquisition of specific skills, including musical ability. Boulez and Manoury then comment on these neurological advances from the perspective of their experience as composers (and as a conductor in the former’s case). Wrapping up the book, Changeux takes an optimistic view of education and musical practice as agents of reconciliation in a conflict-ridden world, though Boulez remains sceptical about music’s potential as a source of universal harmony.

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